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Introduction
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The latest routine international evaluation for conformation traits took place
as scheduled at the Interbull Centre. Data from twenty five (26) countries were
included in this evaluation.

International genetic evaluations for calving traits of bulls from
Australia, Belgium, Canada, Switzerland, Czech Republic, Germany, Denmark-Finland-Sweden,
Spain, France, United Kingdom, Hungary, Ireland, Italy, Japan, Korea, The Netherlands, Norway,
New Zealand, Poland, South Africa, Estonia, Slovenia, Portugal, and United States of America were computed.
Brown Swiss, Guernsey, Holstein, Jersey  and Red Dairy Cattle breed
data were included in this evaluation.


The WHFF trait definitions are available on this link http://www.interbull.org/ib/conf_trait_hol_jer

The following is a list of substitute traits as applied by countries:
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| COU | BRD | TRT_Code | TRT_NAME | Subs_Trt |
|-----|-----|----------|----------------|----------|
| USA | BSW | ofr | overall frame | sta |
| USA | BSW | oru | overall rump | rwi |
| USA | BSW | rle | rump length | rwi |
| USA | BSW | thp | thurl position | rwi |

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Changes in national procedures
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Changes in the national genetic evaluation of conformation traits are as
follows:

NOR (RDC)          Introduction of genetic groups for all traits except for ang, bde, cwi and rwi. OCS: new model and data extraction pipeline for this trait:
                   -Repeatability model, with lactations later than first included from 2015. Technicians now score whole herds, rather than randomly chosen
                   1st lactation daughters in a progeny testing scheme. -New parameters and multitrait constellation. -New fixed effects and definition of
                   genetic groups. ocs changed definition in 2014 and is now run multitrait with the old trait, together with helper traits for the old trait.
                   The ordinary data extraction pipeline is somewhat stricter, causing many bulls to loose from 1 to 12 daughters, depending on size of the
                   progeny group. This also caused 5 bulls to become unofficial as they now got less than 50 daughters. Ftl got its heritability updated and
                   was included in the new models and data extraction pipeline. This means having stricter tests than before.
IRL (HOL,JER,RDC)  Slight decrease in information due to database clean ups
BEL (HOL)          Some bulls with type of proof showing an unexpected change are due to the program used to determine the type of proof for bulls
AUS (ALL)          Drops of information due to data clean up such as pedigree changes or status changes leading to a good number of bulls no longer being
                   qualified. Decreases in EDC are also due to rounding.
ITA (HOL)          Base change plus 1 year cutoff data.
ITA (JER)          Re-estimation of all genetic parameters
SVN (HOL)          Base change, New data and trait definition for FAN which better fit the definition of the 'fan' trait. New trait def: Estimate of the
                   angle on the front side of the hind leg's hoof; the angle from the ground to the hairline on the right hoof
DEU (ALL)          Base change
CHE (ALL)          Base change. Decrease in information due to manual edits in the database
ITA (BSW)          Base change
USA (HOL)          Decrease in information due to parentage verification
NZL (ALL)          Daughter counts: New Zealand has continuous DNA parentage testing so daughters will always change, Herd Count: Affected by continuous DNA
                   parentage testing. EDCs: Affected by continuous DNA parentage testing. Reliability changes.
CAN (ALL)          Base change
GBR (ALL)          Drop in information due to data clean up
USA (JER)          Updated SD used in the multi-trait evaluation of type traits
FRA (ALL)          Base change




INTERBULL CHANGES COMPARED TO THE PREVIOUS ROUTINE RUN
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Post-processing Windows:
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According to the decision taken by ITC in Orlando (2015) to review the
post-processing windows every 5 years, during the 2020 the relative working group
has been re-activated and new windows have been identified.

As before, the upper bounds have been set to 0.99 as these were judged to have
very little effect on evaluations while the lower values have been reduced
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to the 10th percentile. This reduction would provide post-processed correlations to be closer to the
real estimated ones. Over the past five years, in fact, the previous adopted lower value (25th percentile) had been found too high
causing estimated and post-processed correlations to differ significantly from each other.
The new lower values have been applied to all breeds and traits.

The weight assigned to the magnitude of the changes tested by each country has also been revised. The new weight will allow post-processed correlations
to take more in consideration the value of the new estimated ones even when no changes are applied by the countries.
The new weights are as follows:
No changes   :: 2
Small changes:: 1
Big changes  :: 0

More information can be read on https://interbull.org/ib/rg_procedure

DATA AND METHOD OF ANALYSIS
-------------------------------------------------------------------------------
Data were national genetic evaluations of AI sampled bulls with at least
10 daughters or 10 EDC (for clinical mastitis and maternal calving traits at least
50 daughters or 50 EDC, and for direct calving traits at least 50 calvings or 50 EDC) in at
least 10 herds. Table 1 presents the amount of data included
in this Interbull evaluation for all breeds.

National proofs were first de-regressed within country and then analysed
jointly with a linear model including the effects of evaluation country,
genetic group of bull and bull merit. Heritability estimates used in both
the de-regression and international evaluation were as in each country's
national evaluation.

Table 2 presents the date of evaluation as supplied by each country

Estimated genetic parameters and sire standard deviations are shown in APPENDIX I
and the corresponding number of common bulls are listed in APPENDIX II.

SCIENTIFIC LITERATURE
-------------------------------------------------------------------------------
The international genetic evaluation procedure is based on international work
described in the following scientific publications:

International genetic evaluation computation:
     Schaeffer. 1994. J. Dairy Sci. 77:2671-2678
     Klei, 1998. Interbull Bulletin 17:3-7

Verification and Genetic trend validation:
     Klei et al., 2002. Interbull Bulletin 29:178-182.
     Boichard et al., 1995. J. Dairy Sci. 78:431-437

Weighting factors:
     Fikse and Banos, 2001. J. Dairy Sci. 84:1759-1767

De-regression:
     Sigurdsson and G. Banos. 1995. Acta Agric. Scand. 45:207-219
     Jairath et al. 1998. J. Dairy Sci. Vol. 81:550-562

Genetic parameter estimation:
     Klei and Weigel, 1998, Interbull Bulletin 17:8-14
     Sullivan, 1999. Interbull Bulletin 22:146-148

Post-processing of estimated genetic correlations:
     Mark et al., 2003, Interbull Bulletin 30:126-135
     Jorjani et al., 2003. J. Dairy Sci. 86:677-679
     https://wiki.interbull.org/public/rG%20procedure?action=print

Time edits
     Weigel and Banos. 1997. J. Dairy Sci. 80:3425-3430

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International reliability estimation
     Harris and Johnson. 1998. Interbull Bulletin 17:31-36




NEXT ROUTINE INTERNATIONAL EVALUATION
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Dates for the next routine evaluation can be found on
http://www.interbull.org/ib/servicecalendar.

NEXT TEST INTERNATIONAL EVALUATION
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Dates for the next test run can be found on
http://www.interbull.org/ib/servicecalendar.


PUBLICATION OF INTERBULL ROUTINE RUN
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Results were distributed by the Interbull Centre to designated
representatives in each country. The international evaluation file comprised
international proofs expressed on the base and unit of each country included
in the analysis. Such records readily provide more information on bull
performance in various countries, thereby minimizing the need to resort to
conversions.

At the same time, all recipients of Interbull results are expected to honor
the agreed code of practice, decided by the Interbull Steering Committee,
and only publish international evaluations on their own country scale.
Evaluations expressed on another country scale are confidential and may only
be used internally for research and review purposes.


PUBLICATION OF INTERBULL TEST RUN
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Test evaluation results are meant for review purposes only and should not be
published.


^LTable 1. National evaluation data considered in the Interbull
evaluation for conformation traits (April Routine Evaluation 2022).
Number of records for stature by breed
--------------------------------------------------------------------------------------
Country      BSW        GUE        HOL        JER        RDC        SIM
--------------------------------------------------------------------------------------
AUS                      45        3866        748        243
BEL                                1640
CAN          240        100       12242        797        885
CHE          2845                  2982         48
CZE                                4268
DEA          3664
DEU                               20044                   241
DFS                               12159       2056       6352
ESP                                4157
EST                                 813
FRA          385                  17241
FRM
GBR           22        224        6270        450        325
HUN                                2818
IRL                                1816
ISR
ITA          2186                  8512        101
JPN                                5980
KOR                                1447
LTU
LVA                                1223                   603
NLD          128                  15150         47         56
```

```
NOR                                                   2455
NZL                                6670      4080       586
POL                                9020
PRT                                2125
SVK
SVN            333                  611
URY
USA            895        702     33431      4371       267
ZAF                                 851       552
HRV
CAM                                                      36
========================================================================
No.Records   10698       1071    175336     13250     12049
Pub. Proofs   8567        911    138996     11513     12729          0
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^LAPPENDIX I. Sire standard deviations in diagonal and genetic correlations below diagonal
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--------------------------------------------------------------------------------
BSW    sta
--------------------------------------------------------------------------------
        CAN    CHE    FRA    ITA    NLD    USA    DEA    SVN    GBR
CAN     6.40
CHE     0.95   12.42
FRA     0.98   0.96   0.92
ITA     0.96   0.95   0.95   14.10
NLD     0.95   0.95   0.96   0.92   4.15
USA     0.98   0.95   0.97   0.95   0.94   1.64
DEA     0.96   0.98   0.97   0.96   0.95   0.96   11.27
SVN     0.92   0.90   0.90   0.93   0.91   0.90   0.92   15.71
GBR     0.96   0.92   0.95   0.93   0.93   0.95   0.89   0.90   0.83

--------------------------------------------------------------------------------
BSW    cwi
--------------------------------------------------------------------------------
        CAN    CHE    FRA    ITA    NLD    USA    DEA    SVN    GBR
CAN     8.13
CHE     0.90   10.22
FRA     0.87   0.90   0.93
ITA     0.81   0.85   0.87   21.48
NLD     0.91   0.82   0.87   0.71   4.56
USA     0.89   0.90   0.92   0.86   0.82   0.91
DEA     0.87   0.82   0.83   0.75   0.81   0.80   11.40
SVN     0.88   0.88   0.87   0.85   0.81   0.87   0.90   22.49
GBR     0.91   0.84   0.82   0.71   0.90   0.80   0.81   0.81   1.46

--------------------------------------------------------------------------------
BSW    bde
--------------------------------------------------------------------------------
        CAN    CHE    FRA    ITA    NLD    DEA    SVN    GBR    USA
CAN     6.79
CHE     0.84   10.32
FRA     0.72   0.87   0.92
ITA     0.78   0.91   0.91   17.93
NLD     0.82   0.84   0.86   0.85   4.25
DEA     0.80   0.90   0.92   0.89   0.81   11.17
SVN     0.78   0.74   0.80   0.83   0.79   0.73   25.57
GBR     0.86   0.89   0.81   0.84   0.90   0.87   0.85   1.61
USA     0.72   0.75   0.86   0.78   0.86   0.80   0.78   0.86   0.84

--------------------------------------------------------------------------------
BSW    ang
--------------------------------------------------------------------------------
        CAN    CHE    FRA    NLD    USA    GBR
CAN     8.12
CHE     0.69   10.99
FRA     0.87   0.67   0.85
NLD     0.80   0.68   0.69   3.71
```

```
USA        0.86    0.67    0.77    0.77    1.09
GBR        0.89    0.77    0.80    0.82    0.90    0.78


--------------------------------------------------------------------------------
BSW    ran
--------------------------------------------------------------------------------

           CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN        6.84
CHE        0.93   10.65
FRA        0.97    0.96    0.94
ITA        0.94    0.93    0.94   23.03
NLD        0.95    0.92    0.96    0.92    4.51
USA        0.97    0.94    0.97    0.91    0.95    1.36
DEA        0.96    0.94    0.95    0.95    0.92    0.97   11.82
SVN        0.91    0.89    0.90    0.89    0.90    0.90    0.90   21.77
GBR        0.96    0.94    0.97    0.94    0.96    0.96    0.91    0.92    1.93


--------------------------------------------------------------------------------
BSW    rwi
--------------------------------------------------------------------------------

           CAN     CHE     FRA     NLD     USA     DEA     GBR     SVN     ITA
CAN        6.93
CHE        0.89   10.23
FRA        0.96    0.86    0.99
NLD        0.93    0.85    0.93    4.02
USA        0.91    0.84    0.87    0.80    0.97
DEA        0.92    0.89    0.92    0.79    0.90   13.32
GBR        0.93    0.85    0.92    0.88    0.93    0.83    1.36
SVN        0.90    0.80    0.94    0.86    0.83    0.90    0.86   26.57
ITA        0.88    0.79    0.90    0.79    0.86    0.87    0.88    0.89   20.03


--------------------------------------------------------------------------------
BSW    rls
--------------------------------------------------------------------------------

           CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN        7.77
CHE        0.92   13.06
FRA        0.91    0.92    1.01
ITA        0.91    0.86    0.93   23.78
NLD        0.88    0.84    0.88    0.85    5.05
USA        0.95    0.93    0.90    0.87    0.86    0.82
DEA        0.92    0.91    0.92    0.89    0.82    0.91   12.23
SVN        0.86    0.82    0.89    0.85    0.83    0.86    0.89   21.74
GBR        0.85    0.86    0.90    0.83    0.86    0.83    0.87    0.82    1.40


--------------------------------------------------------------------------------
BSW    fan
--------------------------------------------------------------------------------

           CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN        9.12
CHE        0.67   13.93
FRA        0.79    0.72    1.10
ITA        0.69    0.85    0.80   21.68
NLD        0.74    0.68    0.84    0.70    5.03
USA        0.82    0.72    0.84    0.85    0.81    0.86
DEA        0.62    0.91    0.66    0.89    0.63    0.65   11.56
SVN        0.68    0.84    0.70    0.85    0.66    0.70    0.94   24.57
GBR        0.81    0.72    0.90    0.74    0.88    0.83    0.68    0.72    1.25


--------------------------------------------------------------------------------
BSW    hde
--------------------------------------------------------------------------------

           CAN     CHE     FRA     ITA     NLD     DEA     SVN     USA
CAN        8.40
CHE        0.87   12.66
FRA        0.83    0.81    1.17
ITA        0.80    0.84    0.85   21.59
NLD        0.77    0.74    0.83    0.74    5.03
DEA        0.79    0.87    0.85    0.93    0.76   12.16
```

```
SVN      0.77    0.76    0.85    0.89    0.73    0.91   29.98
USA      0.85    0.73    0.85    0.89    0.81    0.78    0.82    0.86


--------------------------------------------------------------------------------
BSW    fua
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      6.80
CHE      0.87   12.08
FRA      0.89    0.87    0.89
ITA      0.88    0.84    0.85   20.43
NLD      0.90    0.85    0.90    0.84    4.59
USA      0.94    0.86    0.86    0.93    0.87    1.31
DEA      0.83    0.85    0.93    0.83    0.81    0.83   11.12
SVN      0.74    0.75    0.83    0.83    0.76    0.74    0.90   20.90
GBR      0.92    0.84    0.88    0.88    0.91    0.91    0.76    0.61    1.34


--------------------------------------------------------------------------------
BSW    ruh
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      7.60
CHE      0.91   11.95
FRA      0.85    0.83    0.92
ITA      0.75    0.84    0.86   13.11
NLD      0.77    0.84    0.87    0.86    4.29
USA      0.83    0.83    0.87    0.87    0.87    1.08
DEA      0.82    0.86    0.90    0.93    0.88    0.85   11.76
SVN      0.81    0.84    0.80    0.87    0.89    0.83    0.89   18.92
GBR      0.74    0.80    0.86    0.83    0.87    0.91    0.76    0.76    1.76


--------------------------------------------------------------------------------
BSW    ruw
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN
CAN      8.16
CHE      0.91   11.96
FRA      0.85    0.86    0.85
ITA      0.78    0.88    0.79   13.42
NLD      0.69    0.66    0.80    0.69    4.29
USA      0.86    0.89    0.85    0.89    0.79    1.02
DEA      0.85    0.91    0.76    0.95    0.55    0.90   12.27
SVN      0.82    0.83    0.76    0.86    0.70    0.82    0.84   17.61


--------------------------------------------------------------------------------
BSW    usu
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      8.50
CHE      0.90   12.00
FRA      0.83    0.91    0.90
ITA      0.89    0.90    0.87   19.00
NLD      0.83    0.83    0.89    0.82    4.12
USA      0.83    0.89    0.87    0.87    0.90    1.00
DEA      0.92    0.92    0.88    0.93    0.78    0.84   11.51
SVN      0.83    0.79    0.65    0.79    0.66    0.71    0.81   23.41
GBR      0.80    0.80    0.86    0.86    0.91    0.93    0.74    0.64    2.88


--------------------------------------------------------------------------------
BSW    ude
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      6.65
CHE      0.96   12.08
FRA      0.95    0.95    0.97
ITA      0.94    0.96    0.96   20.42
NLD      0.95    0.94    0.95    0.93    3.97
USA      0.96    0.95    0.96    0.95    0.94    1.24
DEA      0.92    0.97    0.93    0.97    0.93    0.93   12.04
```

```
SVN      0.93    0.96    0.91    0.96    0.94    0.92    0.96   21.46
GBR      0.96    0.94    0.96    0.94    0.96    0.96    0.90    0.91    2.00


--------------------------------------------------------------------------------
BSW    ftp
--------------------------------------------------------------------------------

         CAN     CHE     FRA     NLD     USA     DEA     SVN     GBR     ITA
CAN      7.53
CHE      0.97   13.97
FRA      0.97    0.95    0.92
NLD      0.96    0.95    0.95    5.09
USA      0.92    0.91    0.88    0.91    1.33
DEA      0.95    0.98    0.95    0.96    0.90   11.08
SVN      0.94    0.93    0.91    0.93    0.90    0.92   17.61
GBR      0.95    0.93    0.89    0.94    0.94    0.91    0.93    1.39
ITA      0.87    0.86    0.86    0.86    0.88    0.86    0.86    0.87   21.67


--------------------------------------------------------------------------------
BSW    ftl
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      6.42
CHE      0.90   14.70
FRA      0.95    0.95    0.95
ITA      0.93    0.94    0.95   18.44
NLD      0.92    0.96    0.92    0.92    4.90
USA      0.93    0.96    0.95    0.93    0.96    1.76
DEA      0.90    0.98    0.97    0.96    0.94    0.96   11.10
SVN      0.90    0.93    0.90    0.93    0.94    0.91    0.93   17.87
GBR      0.95    0.94    0.93    0.94    0.97    0.96    0.93    0.93    1.45


--------------------------------------------------------------------------------
BSW    rtp
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     DEA     SVN     USA
CAN      6.59
CHE      0.98   14.53
FRA      0.97    0.97    0.92
ITA      0.92    0.95    0.93   20.69
NLD      0.97    0.96    0.97    0.92    4.63
DEA      0.96    0.99    0.97    0.96    0.94   12.01
SVN      0.94    0.93    0.92    0.93    0.94    0.93   17.27
USA      0.91    0.88    0.91    0.89    0.94    0.87    0.89    1.33


--------------------------------------------------------------------------------
BSW    ocs
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      7.59
CHE      0.82    9.25
FRA      0.75    0.84    0.94
ITA      0.78    0.81    0.89    9.16
NLD      0.72    0.72    0.77    0.71    3.69
USA      0.82    0.76    0.83    0.82    0.81    0.52
DEA      0.81    0.91    0.89    0.88    0.63    0.75   10.62
SVN      0.64    0.65    0.73    0.70    0.66    0.68    0.76   20.31
GBR      0.76    0.84    0.85    0.79    0.86    0.87    0.70    0.68    1.75


--------------------------------------------------------------------------------
BSW    ous
--------------------------------------------------------------------------------

         CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      8.02
CHE      0.88   13.77
FRA      0.88    0.91    0.93
ITA      0.82    0.88    0.91   10.37
NLD      0.88    0.87    0.91    0.79    4.46
USA      0.83    0.88    0.84    0.82    0.83    0.99
DEA      0.87    0.95    0.90    0.90    0.85    0.88   12.42
```

```
SVN       0.74    0.85    0.77    0.81    0.76    0.81    0.92   19.50
GBR       0.78    0.84    0.75    0.80    0.76    0.86    0.75    0.73    1.59


----------------------------------------------------------------------------------
BSW    ofl
----------------------------------------------------------------------------------

          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN       8.44
CHE       0.83   11.60
FRA       0.65    0.66    1.24
ITA       0.64    0.70    0.85   17.62
NLD       0.66    0.64    0.73    0.64    4.22
USA       0.65    0.63    0.77    0.74    0.65    1.04
DEA       0.69    0.85    0.69    0.81    0.60    0.60   11.29
SVN       0.76    0.86    0.69    0.77    0.65    0.69    0.90   27.69
GBR       0.66    0.75    0.81    0.66    0.73    0.71    0.65    0.62    1.56


----------------------------------------------------------------------------------
BSW    ofr
----------------------------------------------------------------------------------

          CAN     CHE     DEA     ITA     SVN     USA     FRA
CAN       7.00
CHE       0.81   12.05
DEA       0.82    0.90   11.52
ITA       0.79    0.91    0.94   17.21
SVN       0.76    0.79    0.79    0.84   21.68
USA       0.77    0.84    0.91    0.86    0.78    1.64
FRA       0.76    0.87    0.93    0.91    0.83    0.90    0.89


----------------------------------------------------------------------------------
BSW    tpl
----------------------------------------------------------------------------------

          CAN     CHE     DEA     ITA     SVN     FRA
CAN       6.68
CHE       0.88   12.12
DEA       0.91    0.90   11.75
ITA       0.92    0.91    0.94   23.77
SVN       0.88    0.88    0.87    0.86   23.20
FRA       0.96    0.93    0.90    0.91    0.87    1.27


----------------------------------------------------------------------------------
BSW    oru
----------------------------------------------------------------------------------

          CAN     CHE     DEA     ITA     SVN     USA     FRA
CAN       7.01
CHE       0.75   16.23
DEA       0.70    0.86   12.54
ITA       0.91    0.75    0.75   17.45
SVN       0.83    0.58    0.67    0.75   27.45
USA       0.89    0.57    0.48    0.83    0.69    0.97
FRA       0.90    0.88    0.85    0.89    0.74    0.85    1.10


----------------------------------------------------------------------------------
BSW    rle
----------------------------------------------------------------------------------

          CHE     DEA     ITA     SVN     USA     FRA
CHE      11.74
DEA       0.96   12.32
ITA       0.83    0.86   19.77
SVN       0.81    0.82    0.83   26.19
USA       0.55    0.51    0.78    0.69    0.97
FRA       0.92    0.93    0.88    0.81    0.74    1.02


----------------------------------------------------------------------------------
BSW    thp
----------------------------------------------------------------------------------

          CAN     CHE     DEA     ITA     SVN     USA     FRA
CAN       7.53
CHE       0.81   11.32
```

```
DEA      0.76    0.84   12.12
ITA      0.87    0.90    0.85   30.15
SVN      0.80    0.84    0.84    0.89   36.12
USA      0.87    0.87    0.71    0.83    0.71    1.36
FRA      0.90    0.83    0.86    0.85    0.83    0.80    1.01


--------------------------------------------------------------------------------
BSW    hoq
--------------------------------------------------------------------------------

         CAN     CHE     DEA     ITA     SVN     FRA
CAN      7.19
CHE      0.92   12.05
DEA      0.91    0.89   12.50
ITA      0.91    0.83    0.86   19.77
SVN      0.95    0.89    0.93    0.90   21.46
FRA      0.91    0.85    0.89    0.88    0.92    1.03


--------------------------------------------------------------------------------
BSW    ful
--------------------------------------------------------------------------------

         CHE     DEA     ITA     SVN     FRA
CHE     11.79
DEA      0.91   12.31
ITA      0.92    0.95   12.85
SVN      0.80    0.88    0.85   20.42
FRA      0.73    0.82    0.75    0.74    0.94


--------------------------------------------------------------------------------
BSW    udb
--------------------------------------------------------------------------------

         CHE     DEA     ITA     SVN     FRA
CHE     12.00
DEA      0.97   13.24
ITA      0.93    0.96   26.63
SVN      0.82    0.86    0.83   25.69
FRA      0.91    0.87    0.85    0.78    0.95


--------------------------------------------------------------------------------
BSW    tdi
--------------------------------------------------------------------------------

         CHE     DEA     ITA     SVN     FRA
CHE     15.76
DEA      0.96   11.34
ITA      0.94    0.95   20.82
SVN      0.91    0.93    0.93   17.71
FRA      0.96    0.97    0.91    0.91    0.91


--------------------------------------------------------------------------------
BSW    tth
--------------------------------------------------------------------------------

         CHE     DEA     ITA     SVN     FRA
CHE     14.46
DEA      0.98   13.04
ITA      0.94    0.95   23.26
SVN      0.88    0.89    0.88   19.93
FRA      0.93    0.93    0.94    0.88    0.87


--------------------------------------------------------------------------------
GUE    sta
--------------------------------------------------------------------------------

         CAN     GBR     USA     AUS
CAN      6.34
GBR      0.97    1.20
USA      0.98    0.96    2.79
AUS      0.90    0.93    0.91    0.84


--------------------------------------------------------------------------------
GUE    cwi
--------------------------------------------------------------------------------
```

```
            CAN     GBR     USA     AUS
CAN        6.79
GBR        0.92    1.77
USA        0.85    0.85    1.55
AUS        0.72    0.80    0.66    0.34


----------------------------------------------------------------------------------------
GUE    bde
----------------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        6.26
GBR        0.87    1.53
USA        0.75    0.89    1.79
AUS        0.80    0.77    0.70    0.45


----------------------------------------------------------------------------------------
GUE    ang
----------------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        7.82
GBR        0.89    1.70
USA        0.88    0.91    1.90
AUS        0.65    0.76    0.68    0.39


----------------------------------------------------------------------------------------
GUE    ran
----------------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        6.40
GBR        0.97    1.65
USA        0.97    0.97    2.01
AUS        0.90    0.93    0.90    0.76


----------------------------------------------------------------------------------------
GUE    rwi
----------------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        6.86
GBR        0.93    1.52
USA        0.92    0.92    1.74
AUS        0.85    0.84    0.78    0.64


----------------------------------------------------------------------------------------
GUE    rls
----------------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        8.39
GBR        0.82    1.83
USA        0.93    0.81    0.91
AUS        0.71    0.79    0.71    0.32


----------------------------------------------------------------------------------------
GUE    rlr
----------------------------------------------------------------------------------------
            CAN     USA     AUS
CAN        7.18
USA        0.85    0.92
AUS        0.61    0.54    0.20


----------------------------------------------------------------------------------------
GUE    fan
----------------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        8.21
GBR        0.80    1.70
USA        0.84    0.76    0.88
AUS        0.63    0.77    0.65    0.26


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```

```
GUE     fua
--------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       7.30
GBR       0.94    1.55
USA       0.92    0.91    1.84
AUS       0.79    0.78    0.77    0.38

--------------------------------------------------------------------------------
GUE     ruh
--------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       6.95
GBR       0.73    2.05
USA       0.80    0.90    1.49
AUS       0.76    0.77    0.76    0.36

--------------------------------------------------------------------------------
GUE     usu
--------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       6.69
GBR       0.79    1.68
USA       0.80    0.87    1.36
AUS       0.77    0.78    0.75    0.29

--------------------------------------------------------------------------------
GUE     ude
--------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       6.06
GBR       0.97    1.49
USA       0.95    0.95    1.86
AUS       0.89    0.90    0.89    0.53

--------------------------------------------------------------------------------
GUE     ftp
--------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       5.88
GBR       0.96    1.29
USA       0.92    0.92    1.62
AUS       0.92    0.91    0.87    0.40

--------------------------------------------------------------------------------
GUE     ftl
--------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       4.68
GBR       0.95    1.89
USA       0.94    0.97    2.04
AUS       0.93    0.94    0.93    0.95

--------------------------------------------------------------------------------
GUE     rtp
--------------------------------------------------------------------------------
          CAN     AUS     USA
CAN       5.48
AUS       0.89    0.35
USA       0.93    0.89    1.62

--------------------------------------------------------------------------------
GUE     ocs
--------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       8.19
GBR       0.79    2.14
USA       0.75    0.86    0.90
AUS       0.58    0.64    0.57    0.82
```

```
--------------------------------------------------------------------------------
GUE    ous
--------------------------------------------------------------------------------
        CAN    GBR    USA    AUS
CAN    8.00
GBR    0.78   1.54
USA    0.87   0.82   0.83
AUS    0.69   0.81   0.73   1.07


--------------------------------------------------------------------------------
GUE    ofl
--------------------------------------------------------------------------------
        CAN    GBR    USA    AUS
CAN    7.42
GBR    0.68   1.48
USA    0.71   0.68   0.98
AUS    0.42   0.53   0.48   0.60


--------------------------------------------------------------------------------
HOL    sta
--------------------------------------------------------------------------------
        AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT    LVA
AUS    0.64
BEL    0.89   1.08
CAN    0.89   0.94   5.30
CHE    0.89   0.91   0.96   10.70
DEU    0.89   0.92   0.98   0.97   12.88
DFS    0.87   0.95   0.97   0.96   0.97   10.72
ESP    0.89   0.94   0.98   0.96   0.98   0.97   0.82
FRA    0.90   0.96   0.98   0.97   0.97   0.97   0.98   1.06
GBR    0.93   0.92   0.97   0.95   0.96   0.94   0.96   0.97   1.09
ITA    0.88   0.89   0.95   0.93   0.94   0.94   0.95   0.95   0.95   1.08
NLD    0.87   0.93   0.96   0.97   0.98   0.97   0.97   0.97   0.94   0.92   4.14
USA    0.90   0.92   0.98   0.94   0.96   0.94   0.96   0.96   0.97   0.94   0.93   1.20
HUN    0.89   0.92   0.96   0.93   0.96   0.93   0.96   0.97   0.95   0.93   0.93   0.94   0.91
POL    0.84   0.87   0.92   0.90   0.93   0.90   0.93   0.92   0.90   0.90   0.91   0.90   0.91   9.91
NZL    0.88   0.85   0.84   0.84   0.83   0.83   0.83   0.87   0.89   0.83   0.83   0.84   0.83   0.83   0.43
ZAF    0.90   0.91   0.91   0.88   0.89   0.87   0.89   0.91   0.93   0.86   0.86   0.91   0.88   0.86   0.88   0.73
JPN    0.89   0.95   0.98   0.97   0.97   0.97   0.98   0.98   0.96   0.95   0.96   0.97   0.95   0.92   0.86   0.90   1.20
CZE    0.89   0.94   0.97   0.94   0.97   0.95   0.96   0.96   0.95   0.92   0.95   0.95   0.96   0.92   0.84   0.92   0.96   13.05
EST    0.87   0.92   0.94   0.93   0.96   0.95   0.93   0.95   0.92   0.93   0.96   0.90   0.93   0.91   0.85   0.87   0.94   0.96   14.85
IRL    0.89   0.88   0.92   0.91   0.91   0.88   0.92   0.93   0.97   0.91   0.89   0.93   0.91   0.86   0.87   0.90   0.91   0.93   0.89   0.71
KOR    0.84   0.84   0.85   0.84   0.84   0.84   0.84   0.86   0.86   0.84   0.84   0.84   0.85   0.84   0.83   0.84   0.85   0.86   0.85   0.84   4.50
SVN    0.88   0.92   0.95   0.95   0.96   0.96   0.96   0.96   0.92   0.91   0.96   0.93   0.91   0.93   0.84   0.85   0.95   0.93   0.93   0.88   0.84   14.35
PRT    0.87   0.90   0.94   0.91   0.95   0.93   0.94   0.94   0.94   0.91   0.91   0.92   0.93   0.89   0.83   0.87   0.94   0.94   0.91   0.90   0.83   0.90   1.19
LVA    0.84   0.83   0.83   0.84   0.83   0.83   0.83   0.83   0.83   0.83   0.83   0.83   0.83   0.83   0.84   0.84   0.83   0.83   0.84   0.84   0.83   0.84   0.83   0.43

--------------------------------------------------------------------------------
HOL    cwi
--------------------------------------------------------------------------------
        AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT    LVA
AUS    0.41
BEL    0.66   1.70
CAN    0.73   0.85   6.38
CHE    0.65   0.85   0.90   11.10
DEU    0.69   0.88   0.90   0.84   12.43
DFS    0.71   0.87   0.92   0.84   0.94   12.67
ESP    0.67   0.88   0.91   0.87   0.82   0.85   1.05
FRA    0.64   0.91   0.85   0.92   0.86   0.83   0.85   1.14
GBR    0.82   0.85   0.92   0.85   0.90   0.89   0.85   0.82   1.45
ITA    0.64   0.79   0.75   0.81   0.69   0.66   0.81   0.88   0.70   1.25
NLD    0.72   0.87   0.92   0.87   0.94   0.91   0.85   0.86   0.91   0.71   5.02
USA    0.64   0.83   0.85   0.87   0.81   0.80   0.85   0.92   0.80   0.91   0.81   1.25
HUN    0.64   0.83   0.86   0.83   0.84   0.83   0.83   0.89   0.78   0.81   0.81   0.88   1.14
POL    0.64   0.89   0.87   0.83   0.86   0.86   0.87   0.85   0.83   0.78   0.84   0.82   0.83   12.36
NZL    0.78   0.64   0.71   0.65   0.69   0.71   0.71   0.65   0.79   0.63   0.68   0.68   0.63   0.64   0.38
ZAF    0.67   0.89   0.83   0.86   0.85   0.85   0.86   0.88   0.89   0.75   0.85   0.87   0.83   0.83   0.70   0.83
JPN    0.63   0.83   0.75   0.83   0.71   0.71   0.81   0.91   0.67   0.92   0.71   0.91   0.84   0.75   0.63   0.77   1.54
```

```
CZE   0.71  0.91  0.92  0.85  0.91  0.91  0.91  0.85  0.88  0.77  0.89  0.84  0.87  0.89  0.70  0.87  0.78  14.17
EST   0.73  0.77  0.84  0.75  0.76  0.83  0.81  0.70  0.80  0.64  0.82  0.65  0.65  0.71  0.67  0.71  0.64  0.78  23.53
IRL   0.79  0.76  0.82  0.78  0.85  0.81  0.73  0.76  0.93  0.64  0.83  0.73  0.73  0.74  0.82  0.82  0.63  0.82  0.73  1.34
KOR   0.64  0.73  0.64  0.64  0.72  0.71  0.70  0.72  0.65  0.66  0.64  0.71  0.72  0.64  0.67  0.67  0.70  0.75  0.64  0.64  2.59
SVN   0.64  0.78  0.82  0.79  0.86  0.86  0.81  0.79  0.78  0.67  0.85  0.79  0.85  0.78  0.64  0.84  0.68  0.82  0.72  0.72  0.65  20.78
PRT   0.65  0.82  0.81  0.79  0.86  0.83  0.81  0.83  0.80  0.75  0.84  0.83  0.86  0.84  0.63  0.78  0.76  0.85  0.64  0.74  0.69  0.75  2.04
LVA   0.63  0.73  0.68  0.75  0.69  0.72  0.63  0.71  0.64  0.63  0.70  0.66  0.64  0.68  0.63  0.64  0.65  0.69  0.71  0.63  0.64  0.70  0.67  0.36
```

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HOL    bde
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```
        AUS   BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   HUN   POL   NZL   ZAF   JPN   CZE   EST   IRL   KOR   PRT   SVN   LVA
AUS   0.53
BEL   0.69  1.42
CAN   0.83  0.77  5.46
CHE   0.72  0.91  0.87  11.28
DEU   0.74  0.92  0.88  0.91  11.70
DFS   0.80  0.85  0.92  0.88  0.94  11.75
ESP   0.74  0.90  0.89  0.92  0.91  0.90  0.98
FRA   0.68  0.92  0.68  0.87  0.83  0.74  0.84  1.07
GBR   0.78  0.90  0.88  0.92  0.92  0.91  0.92  0.81  1.34
ITA   0.69  0.88  0.70  0.85  0.85  0.78  0.86  0.90  0.86  1.20
NLD   0.69  0.88  0.83  0.92  0.91  0.85  0.91  0.86  0.91  0.88  4.76
USA   0.69  0.92  0.74  0.89  0.89  0.80  0.89  0.92  0.87  0.92  0.90  1.15
HUN   0.69  0.90  0.81  0.88  0.90  0.86  0.91  0.83  0.89  0.84  0.85  0.89  1.05
POL   0.76  0.82  0.85  0.83  0.92  0.90  0.87  0.71  0.88  0.80  0.83  0.81  0.87  12.46
NZL   0.77  0.68  0.68  0.68  0.68  0.69  0.68  0.68  0.68  0.68  0.68  0.68  0.68  0.71  0.38
ZAF   0.73  0.87  0.83  0.83  0.87  0.87  0.88  0.75  0.91  0.76  0.82  0.85  0.84  0.86  0.68  0.87
JPN   0.69  0.94  0.74  0.90  0.90  0.82  0.89  0.95  0.86  0.90  0.91  0.95  0.88  0.79  0.68  0.80  1.37
CZE   0.80  0.82  0.93  0.84  0.93  0.92  0.88  0.69  0.90  0.76  0.83  0.80  0.88  0.92  0.69  0.86  0.79  15.38
EST   0.76  0.81  0.91  0.86  0.88  0.89  0.89  0.74  0.86  0.75  0.84  0.81  0.84  0.86  0.64  0.77  0.81  0.89  18.77
IRL   0.79  0.84  0.84  0.88  0.88  0.89  0.87  0.75  0.94  0.81  0.86  0.83  0.82  0.84  0.73  0.87  0.80  0.86  0.79  1.17
KOR   0.68  0.81  0.70  0.79  0.84  0.83  0.79  0.76  0.76  0.69  0.71  0.75  0.79  0.72  0.67  0.74  0.80  0.78  0.73  0.73  3.31
PRT   0.76  0.80  0.80  0.79  0.89  0.86  0.83  0.69  0.86  0.77  0.78  0.79  0.85  0.87  0.71  0.82  0.80  0.87  0.77  0.84  0.71  1.96
SVN   0.73  0.88  0.84  0.88  0.90  0.87  0.91  0.84  0.88  0.83  0.92  0.86  0.86  0.85  0.66  0.78  0.86  0.84  0.85  0.84  0.75  0.76  20.43
LVA   0.72  0.70  0.78  0.76  0.79  0.81  0.72  0.67  0.77  0.68  0.70  0.68  0.79  0.78  0.67  0.69  0.68  0.84  0.71  0.76  0.76  0.78  0.68  0.34
```

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HOL    ang
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```
        AUS   BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   HUN   POL   ZAF   JPN   CZE   EST   IRL   KOR   PRT   SVN   LVA
AUS   0.43
BEL   0.60  1.15
CAN   0.65  0.75  6.62
CHE   0.60  0.76  0.88  11.42
DEU   0.62  0.71  0.81  0.75  12.72
DFS   0.67  0.85  0.89  0.81  0.82  10.43
ESP   0.64  0.76  0.86  0.78  0.72  0.84  0.72
FRA   0.62  0.84  0.88  0.86  0.76  0.87  0.82  0.93
GBR   0.77  0.75  0.91  0.79  0.78  0.87  0.81  0.80  1.53
ITA   0.66  0.73  0.89  0.79  0.76  0.84  0.87  0.81  0.84  1.27
NLD   0.71  0.61  0.82  0.75  0.60  0.72  0.78  0.68  0.83  0.78  4.46
USA   0.67  0.75  0.93  0.81  0.85  0.90  0.83  0.83  0.90  0.84  0.74  1.38
HUN   0.60  0.71  0.76  0.71  0.81  0.78  0.70  0.80  0.72  0.74  0.60  0.79  1.02
POL   0.60  0.67  0.70  0.67  0.62  0.73  0.77  0.71  0.66  0.80  0.65  0.68  0.60  10.06
ZAF   0.63  0.81  0.71  0.68  0.74  0.79  0.69  0.74  0.85  0.74  0.61  0.77  0.78  0.63  0.72
JPN   0.66  0.80  0.90  0.81  0.80  0.91  0.87  0.84  0.86  0.90  0.78  0.88  0.77  0.77  0.77  1.43
CZE   0.66  0.78  0.81  0.75  0.74  0.85  0.74  0.76  0.75  0.78  0.64  0.77  0.81  0.64  0.68  0.80  14.18
EST   0.63  0.79  0.62  0.64  0.65  0.78  0.62  0.68  0.64  0.62  0.61  0.61  0.76  0.63  0.75  0.69  0.71  24.54
IRL   0.72  0.72  0.86  0.75  0.78  0.82  0.79  0.80  0.92  0.82  0.73  0.87  0.73  0.64  0.80  0.85  0.76  0.62  0.73
KOR   0.69  0.77  0.78  0.73  0.71  0.74  0.76  0.74  0.79  0.74  0.65  0.78  0.77  0.64  0.77  0.84  0.70  0.70  0.75  2.26
PRT   0.60  0.69  0.77  0.65  0.77  0.79  0.74  0.73  0.78  0.77  0.60  0.80  0.71  0.65  0.70  0.81  0.71  0.62  0.75  0.77  1.18
SVN   0.68  0.64  0.72  0.72  0.61  0.66  0.68  0.66  0.69  0.74  0.68  0.63  0.61  0.83  0.64  0.70  0.62  0.71  0.63  0.75  0.63  20.54
LVA   0.61  0.61  0.61  0.61  0.60  0.61  0.60  0.61  0.61  0.61  0.61  0.60  0.61  0.61  0.62  0.61  0.61  0.63  0.61  0.61  0.61  0.62  0.32
```

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HOL    ran
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```
        AUS   BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   HUN   POL   NZL   ZAF   JPN   CZE   EST   IRL   KOR   SVN   PRT   LVA
```

```
AUS    0.63
BEL    0.94   1.47
CAN    0.90   0.97   6.05
CHE    0.92   0.96   0.96   11.38
DEU    0.92   0.97   0.98   0.95   12.20
DFS    0.92   0.98   0.98   0.96   0.98   11.60
ESP    0.91   0.97   0.97   0.97   0.97   0.96   1.15
FRA    0.95   0.98   0.97   0.97   0.97   0.96   0.97   1.07
GBR    0.93   0.96   0.97   0.95   0.97   0.95   0.96   0.98   1.41
ITA    0.88   0.95   0.95   0.93   0.96   0.94   0.95   0.95   0.95   1.43
NLD    0.91   0.96   0.97   0.95   0.98   0.96   0.97   0.96   0.97   0.94   5.06
USA    0.90   0.95   0.97   0.95   0.97   0.96   0.96   0.96   0.97   0.94   0.96   1.45
HUN    0.91   0.97   0.95   0.95   0.97   0.96   0.97   0.97   0.95   0.95   0.95   0.94   1.05
POL    0.89   0.96   0.96   0.94   0.96   0.96   0.96   0.94   0.94   0.94   0.95   0.92   0.95   11.22
NZL    0.94   0.89   0.88   0.89   0.88   0.87   0.87   0.93   0.93   0.87   0.88   0.89   0.88   0.87   0.34
ZAF    0.95   0.95   0.92   0.91   0.92   0.92   0.93   0.94   0.93   0.88   0.93   0.92   0.94   0.88   0.89   0.88
JPN    0.88   0.95   0.97   0.96   0.96   0.96   0.96   0.94   0.92   0.93   0.94   0.94   0.95   0.95   0.86   0.88   1.44
CZE    0.88   0.95   0.96   0.92   0.97   0.95   0.95   0.94   0.96   0.94   0.96   0.97   0.95   0.94   0.87   0.90   0.93   14.53
EST    0.87   0.92   0.94   0.90   0.95   0.93   0.92   0.92   0.92   0.92   0.96   0.93   0.91   0.94   0.84   0.87   0.92   0.93   18.74
IRL    0.93   0.92   0.92   0.93   0.94   0.91   0.91   0.95   0.98   0.92   0.94   0.94   0.90   0.89   0.94   0.90   0.88   0.91   0.89   1.76
KOR    0.88   0.89   0.88   0.88   0.88   0.88   0.90   0.88   0.88   0.88   0.88   0.88   0.89   0.88   0.87   0.88   0.89   0.88   0.86   0.87   4.81
SVN    0.90   0.95   0.95   0.93   0.95   0.96   0.94   0.95   0.93   0.93   0.94   0.93   0.92   0.94   0.88   0.88   0.95   0.91   0.90   0.90   0.87   17.86
PRT    0.87   0.92   0.92   0.90   0.94   0.92   0.94   0.93   0.93   0.92   0.93   0.93   0.93   0.92   0.88   0.87   0.90   0.93   0.89   0.90   0.87   0.93   1.78
LVA    0.87   0.93   0.94   0.92   0.94   0.94   0.93   0.92   0.91   0.92   0.93   0.91   0.93   0.93   0.86   0.87   0.95   0.91   0.90   0.89   0.88   0.91   0.89   0.46

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HOL    rwi
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       AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    PRT    SVN    LVA
AUS    0.52
BEL    0.84   1.46
CAN    0.87   0.95   5.71
CHE    0.86   0.95   0.93   11.14
DEU    0.81   0.93   0.95   0.90   11.43
DFS    0.81   0.92   0.95   0.89   0.97   12.41
ESP    0.89   0.93   0.97   0.91   0.95   0.94   0.99
FRA    0.86   0.97   0.97   0.93   0.95   0.95   0.95   1.11
GBR    0.85   0.91   0.94   0.87   0.90   0.91   0.92   0.94   1.32
ITA    0.77   0.84   0.88   0.81   0.85   0.84   0.88   0.89   0.89   1.31
NLD    0.85   0.95   0.94   0.93   0.96   0.93   0.94   0.95   0.89   0.80   4.80
USA    0.77   0.85   0.91   0.80   0.85   0.87   0.88   0.89   0.94   0.89   0.81   1.28
HUN    0.78   0.91   0.92   0.85   0.93   0.91   0.90   0.93   0.90   0.89   0.90   0.88   1.02
POL    0.82   0.91   0.92   0.89   0.90   0.90   0.90   0.91   0.88   0.86   0.88   0.82   0.91   11.25
NZL    0.84   0.84   0.87   0.80   0.82   0.80   0.86   0.85   0.87   0.79   0.83   0.82   0.81   0.76   0.31
ZAF    0.77   0.82   0.85   0.77   0.85   0.84   0.81   0.83   0.91   0.80   0.79   0.87   0.85   0.79   0.79   0.89
JPN    0.82   0.95   0.96   0.94   0.94   0.94   0.94   0.97   0.93   0.90   0.93   0.90   0.94   0.92   0.84   0.85   1.32
CZE    0.81   0.92   0.94   0.88   0.96   0.93   0.95   0.93   0.90   0.86   0.93   0.87   0.92   0.91   0.84   0.82   0.93   14.87
EST    0.80   0.90   0.90   0.90   0.92   0.87   0.89   0.89   0.85   0.83   0.92   0.78   0.88   0.91   0.81   0.79   0.88   0.91   17.28
IRL    0.77   0.77   0.80   0.77   0.79   0.78   0.77   0.79   0.87   0.77   0.77   0.85   0.78   0.77   0.79   0.78   0.79   0.79   0.79   1.57
KOR    0.77   0.83   0.81   0.80   0.80   0.78   0.78   0.83   0.77   0.77   0.79   0.77   0.83   0.78   0.77   0.77   0.82   0.79   0.79   0.77   3.28
PRT    0.78   0.86   0.88   0.80   0.89   0.89   0.87   0.87   0.85   0.84   0.82   0.85   0.88   0.85   0.76   0.83   0.87   0.87   0.78   0.77   0.77   1.68
SVN    0.81   0.91   0.93   0.91   0.93   0.93   0.93   0.91   0.88   0.81   0.93   0.85   0.89   0.91   0.78   0.82   0.92   0.92   0.89   0.78   0.79   0.83   21.28
LVA    0.77   0.81   0.79   0.77   0.82   0.85   0.79   0.80   0.76   0.76   0.79   0.76   0.80   0.79   0.77   0.77   0.79   0.82   0.80   0.76   0.77   0.76   0.81   0.43

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HOL    rls
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       AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT    LVA
AUS    0.31
BEL    0.78   1.82
CAN    0.71   0.95   6.08
CHE    0.79   0.92   0.93   11.74
DEU    0.73   0.94   0.95   0.92   11.93
DFS    0.69   0.94   0.97   0.92   0.96   13.46
ESP    0.73   0.95   0.95   0.92   0.96   0.95   1.19
FRA    0.78   0.91   0.89   0.90   0.89   0.88   0.91   1.07
GBR    0.80   0.87   0.84   0.85   0.86   0.82   0.83   0.90   1.43
ITA    0.67   0.89   0.89   0.85   0.90   0.90   0.90   0.89   0.82   1.50
NLD    0.73   0.90   0.93   0.91   0.94   0.92   0.92   0.89   0.86   0.86   5.25
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USA   0.70   0.96   0.96   0.89   0.93   0.96   0.95   0.88   0.82   0.88   0.90   1.64
HUN   0.74   0.92   0.91   0.87   0.93   0.91   0.94   0.88   0.82   0.89   0.86   0.91   1.01
POL   0.70   0.92   0.92   0.87   0.95   0.91   0.93   0.90   0.81   0.89   0.86   0.90   0.94  12.09
NZL   0.68   0.65   0.65   0.66   0.65   0.65   0.65   0.69   0.72   0.65   0.65   0.65   0.66   0.66   0.14
ZAF   0.82   0.81   0.78   0.78   0.74   0.70   0.78   0.84   0.87   0.69   0.75   0.77   0.75   0.79   0.66   0.84
JPN   0.67   0.91   0.97   0.90   0.94   0.97   0.94   0.87   0.80   0.89   0.89   0.94   0.89   0.93   0.65   0.71   1.75
CZE   0.70   0.91   0.92   0.84   0.93   0.92   0.91   0.87   0.85   0.87   0.88   0.91   0.92   0.94   0.65   0.77   0.91  15.33
EST   0.71   0.85   0.85   0.85   0.90   0.88   0.88   0.84   0.72   0.84   0.89   0.85   0.85   0.88   0.66   0.68   0.86   0.82  20.86
IRL   0.79   0.77   0.71   0.78   0.74   0.70   0.71   0.81   0.90   0.73   0.76   0.70   0.71   0.71   0.69   0.79   0.69   0.73   0.68   1.57
KOR   0.67   0.81   0.85   0.81   0.83   0.86   0.87   0.81   0.74   0.79   0.82   0.84   0.85   0.81   0.66   0.67   0.86   0.80   0.75   0.67   2.27
SVN   0.68   0.90   0.95   0.90   0.93   0.95   0.90   0.89   0.81   0.89   0.91   0.91   0.90   0.87   0.67   0.68   0.92   0.86   0.86   0.70   0.84  22.55
PRT   0.67   0.87   0.83   0.78   0.84   0.85   0.86   0.83   0.76   0.84   0.81   0.85   0.85   0.82   0.65   0.66   0.82   0.81   0.71   0.66   0.80   0.83   2.33
LVA   0.66   0.75   0.80   0.83   0.82   0.80   0.79   0.80   0.74   0.74   0.83   0.77   0.80   0.80   0.66   0.66   0.79   0.80   0.75   0.66   0.78   0.78   0.74   0.31
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HOL   rlr

| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | ZAF | JPN | CZE | EST | IRL | KOR | SVN | PRT | LVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0.24 | | | | | | | | | | | | | | | | | | | | | | |
| BEL | 0.64 | 1.81 | | | | | | | | | | | | | | | | | | | | | |
| CAN | 0.58 | 0.85 | 6.74 | | | | | | | | | | | | | | | | | | | | |
| CHE | 0.70 | 0.85 | 0.75 | 12.37 | | | | | | | | | | | | | | | | | | | |
| DEU | 0.61 | 0.92 | 0.88 | 0.75 | 11.36 | | | | | | | | | | | | | | | | | | |
| DFS | 0.57 | 0.89 | 0.90 | 0.75 | 0.93 | 13.24 | | | | | | | | | | | | | | | | | |
| ESP | 0.59 | 0.87 | 0.88 | 0.72 | 0.87 | 0.89 | 1.11 | | | | | | | | | | | | | | | | |
| FRA | 0.70 | 0.92 | 0.85 | 0.86 | 0.86 | 0.83 | 0.87 | 1.08 | | | | | | | | | | | | | | | |
| GBR | 0.50 | 0.64 | 0.68 | 0.55 | 0.64 | 0.61 | 0.69 | 0.63 | 1.51 | | | | | | | | | | | | | | |
| ITA | 0.57 | 0.79 | 0.81 | 0.67 | 0.77 | 0.74 | 0.81 | 0.82 | 0.67 | 1.81 | | | | | | | | | | | | | |
| NLD | 0.57 | 0.89 | 0.87 | 0.71 | 0.91 | 0.91 | 0.84 | 0.83 | 0.64 | 0.75 | 4.09 | | | | | | | | | | | | |
| USA | 0.53 | 0.78 | 0.87 | 0.62 | 0.77 | 0.83 | 0.79 | 0.78 | 0.66 | 0.87 | 0.81 | 1.77 | | | | | | | | | | | |
| HUN | 0.62 | 0.84 | 0.77 | 0.76 | 0.80 | 0.78 | 0.75 | 0.81 | 0.53 | 0.76 | 0.75 | 0.78 | 1.12 | | | | | | | | | | |
| POL | 0.53 | 0.81 | 0.84 | 0.67 | 0.78 | 0.82 | 0.76 | 0.80 | 0.52 | 0.79 | 0.74 | 0.76 | 0.71 | 14.99 | | | | | | | | | |
| ZAF | 0.57 | 0.71 | 0.56 | 0.60 | 0.55 | 0.55 | 0.50 | 0.63 | 0.50 | 0.63 | 0.53 | 0.70 | 0.65 | 0.61 | 0.73 | | | | | | | | |
| JPN | 0.59 | 0.83 | 0.88 | 0.77 | 0.84 | 0.92 | 0.80 | 0.82 | 0.50 | 0.70 | 0.83 | 0.77 | 0.75 | 0.76 | 0.56 | 2.01 | | | | | | | |
| CZE | 0.57 | 0.83 | 0.81 | 0.70 | 0.85 | 0.81 | 0.77 | 0.79 | 0.57 | 0.81 | 0.78 | 0.79 | 0.78 | 0.82 | 0.68 | 0.73 | 16.82 | | | | | | |
| EST | 0.52 | 0.68 | 0.57 | 0.55 | 0.74 | 0.76 | 0.59 | 0.58 | 0.50 | 0.51 | 0.72 | 0.52 | 0.56 | 0.58 | 0.49 | 0.75 | 0.57 | 19.28 | | | | | |
| IRL | 0.50 | 0.53 | 0.55 | 0.50 | 0.50 | 0.50 | 0.59 | 0.55 | 0.72 | 0.66 | 0.54 | 0.53 | 0.50 | 0.51 | 0.50 | 0.50 | 0.51 | 0.52 | 1.64 | | | | |
| KOR | 0.56 | 0.71 | 0.75 | 0.62 | 0.73 | 0.76 | 0.79 | 0.77 | 0.50 | 0.70 | 0.70 | 0.71 | 0.64 | 0.70 | 0.51 | 0.73 | 0.71 | 0.57 | 0.51 | 2.05 | | | |
| SVN | 0.55 | 0.88 | 0.80 | 0.75 | 0.85 | 0.86 | 0.79 | 0.83 | 0.51 | 0.73 | 0.86 | 0.78 | 0.83 | 0.73 | 0.53 | 0.84 | 0.74 | 0.66 | 0.51 | 0.68 | 25.19 | | |
| PRT | 0.54 | 0.84 | 0.73 | 0.67 | 0.85 | 0.76 | 0.77 | 0.81 | 0.59 | 0.72 | 0.75 | 0.69 | 0.72 | 0.76 | 0.52 | 0.67 | 0.78 | 0.63 | 0.49 | 0.69 | 0.84 | 2.42 | |
| LVA | 0.55 | 0.75 | 0.73 | 0.70 | 0.75 | 0.80 | 0.73 | 0.70 | 0.54 | 0.73 | 0.72 | 0.72 | 0.69 | 0.79 | 0.50 | 0.73 | 0.75 | 0.62 | 0.49 | 0.70 | 0.72 | 0.75 | 0.28 |

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HOL   fan

| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | ZAF | JPN | CZE | EST | IRL | KOR | SVN | PRT | LVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0.32 | | | | | | | | | | | | | | | | | | | | | | |
| BEL | 0.68 | 2.08 | | | | | | | | | | | | | | | | | | | | | |
| CAN | 0.61 | 0.83 | 7.34 | | | | | | | | | | | | | | | | | | | | |
| CHE | 0.65 | 0.84 | 0.80 | 12.04 | | | | | | | | | | | | | | | | | | | |
| DEU | 0.70 | 0.88 | 0.83 | 0.78 | 12.68 | | | | | | | | | | | | | | | | | | |
| DFS | 0.62 | 0.92 | 0.88 | 0.80 | 0.87 | 13.21 | | | | | | | | | | | | | | | | | |
| ESP | 0.66 | 0.77 | 0.86 | 0.69 | 0.85 | 0.81 | 1.01 | | | | | | | | | | | | | | | | |
| FRA | 0.77 | 0.79 | 0.79 | 0.73 | 0.90 | 0.74 | 0.85 | 1.03 | | | | | | | | | | | | | | | |
| GBR | 0.75 | 0.80 | 0.82 | 0.73 | 0.92 | 0.78 | 0.85 | 0.92 | 1.45 | | | | | | | | | | | | | | |
| ITA | 0.62 | 0.69 | 0.77 | 0.69 | 0.77 | 0.73 | 0.75 | 0.74 | 0.75 | 1.56 | | | | | | | | | | | | | |
| NLD | 0.68 | 0.78 | 0.75 | 0.72 | 0.91 | 0.79 | 0.79 | 0.85 | 0.88 | 0.73 | 5.06 | | | | | | | | | | | | |
| USA | 0.65 | 0.75 | 0.87 | 0.71 | 0.84 | 0.81 | 0.85 | 0.82 | 0.84 | 0.85 | 0.80 | 1.59 | | | | | | | | | | | |
| HUN | 0.76 | 0.77 | 0.78 | 0.77 | 0.88 | 0.74 | 0.84 | 0.91 | 0.87 | 0.69 | 0.80 | 0.80 | 1.17 | | | | | | | | | | |
| POL | 0.62 | 0.72 | 0.76 | 0.73 | 0.71 | 0.71 | 0.72 | 0.70 | 0.68 | 0.73 | 0.63 | 0.75 | 0.74 | 13.01 | | | | | | | | | |
| ZAF | 0.83 | 0.78 | 0.77 | 0.74 | 0.83 | 0.73 | 0.78 | 0.85 | 0.87 | 0.70 | 0.74 | 0.80 | 0.87 | 0.64 | 0.89 | | | | | | | | |
| JPN | 0.74 | 0.76 | 0.74 | 0.83 | 0.83 | 0.75 | 0.76 | 0.80 | 0.76 | 0.69 | 0.79 | 0.77 | 0.86 | 0.68 | 0.76 | 2.10 | | | | | | | |
| CZE | 0.72 | 0.85 | 0.84 | 0.78 | 0.92 | 0.83 | 0.84 | 0.88 | 0.85 | 0.76 | 0.81 | 0.83 | 0.92 | 0.75 | 0.81 | 0.86 | 15.64 | | | | | | |
| EST | 0.75 | 0.76 | 0.74 | 0.74 | 0.84 | 0.78 | 0.86 | 0.86 | 0.82 | 0.63 | 0.85 | 0.75 | 0.85 | 0.63 | 0.75 | 0.88 | 0.87 | 23.45 | | | | | |
| IRL | 0.69 | 0.70 | 0.73 | 0.64 | 0.81 | 0.69 | 0.74 | 0.77 | 0.91 | 0.69 | 0.75 | 0.72 | 0.71 | 0.65 | 0.74 | 0.62 | 0.72 | 0.69 | 1.60 | | | | |
| KOR | 0.62 | 0.62 | 0.70 | 0.62 | 0.69 | 0.64 | 0.77 | 0.70 | 0.70 | 0.62 | 0.64 | 0.72 | 0.73 | 0.63 | 0.63 | 0.62 | 0.71 | 0.65 | 0.62 | 1.54 | | | |
| SVN | 0.62 | 0.75 | 0.82 | 0.66 | 0.87 | 0.82 | 0.81 | 0.76 | 0.78 | 0.71 | 0.73 | 0.83 | 0.77 | 0.77 | 0.72 | 0.75 | 0.86 | 0.78 | 0.79 | 0.63 | 23.05 | | |
| PRT | 0.61 | 0.61 | 0.61 | 0.61 | 0.74 | 0.61 | 0.71 | 0.74 | 0.66 | 0.64 | 0.68 | 0.73 | 0.63 | 0.61 | 0.65 | 0.65 | 0.70 | 0.72 | 0.61 | 0.71 | 0.73 | 2.07 | |
| LVA | 0.61 | 0.65 | 0.61 | 0.64 | 0.66 | 0.67 | 0.63 | 0.73 | 0.68 | 0.62 | 0.65 | 0.69 | 0.68 | 0.60 | 0.61 | 0.61 | 0.71 | 0.75 | 0.61 | 0.61 | 0.68 | 0.61 | 0.28 |

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HOL    fua
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        AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT    LVA
AUS    0.37
BEL    0.74   1.48
CAN    0.77   0.78   5.18
CHE    0.83   0.81   0.92   12.03
DEU    0.75   0.84   0.93   0.87   12.31
DFS    0.77   0.85   0.90   0.89   0.88   11.87
ESP    0.78   0.79   0.88   0.86   0.84   0.83   0.85
FRA    0.79   0.91   0.90   0.89   0.90   0.92   0.84   1.06
GBR    0.78   0.79   0.95   0.88   0.96   0.87   0.87   0.90   1.31
ITA    0.71   0.65   0.88   0.83   0.86   0.76   0.85   0.81   0.90   1.29
NLD    0.76   0.87   0.93   0.91   0.95   0.90   0.86   0.92   0.93   0.82   4.95
USA    0.75   0.70   0.94   0.87   0.90   0.84   0.89   0.84   0.94   0.93   0.88   1.41
HUN    0.78   0.74   0.89   0.87   0.86   0.87   0.82   0.85   0.87   0.79   0.85   0.82   1.03
POL    0.72   0.81   0.85   0.85   0.91   0.88   0.81   0.88   0.88   0.78   0.87   0.81   0.85   11.71
NZL    0.77   0.77   0.84   0.80   0.84   0.81   0.80   0.86   0.87   0.77   0.84   0.85   0.74   0.76   0.41
ZAF    0.75   0.78   0.86   0.82   0.87   0.86   0.81   0.84   0.89   0.72   0.85   0.82   0.82   0.77   0.80   0.85
JPN    0.75   0.76   0.95   0.91   0.90   0.91   0.84   0.87   0.91   0.86   0.89   0.91   0.88   0.85   0.82   0.82   1.44
CZE    0.75   0.86   0.87   0.85   0.93   0.90   0.79   0.90   0.90   0.76   0.90   0.79   0.91   0.90   0.76   0.90   0.86   14.35
EST    0.63   0.73   0.78   0.74   0.79   0.82   0.65   0.80   0.77   0.62   0.81   0.69   0.79   0.76   0.68   0.74   0.71   0.79   19.37
IRL    0.77   0.74   0.83   0.81   0.84   0.74   0.86   0.82   0.92   0.86   0.82   0.88   0.70   0.77   0.83   0.78   0.78   0.75   0.64   1.17
KOR    0.69   0.76   0.67   0.74   0.69   0.77   0.73   0.75   0.69   0.60   0.70   0.64   0.77   0.73   0.67   0.80   0.72   0.80   0.64   0.68   3.28
SVN    0.53   0.78   0.52   0.57   0.66   0.60   0.62   0.65   0.53   0.54   0.65   0.54   0.55   0.64   0.54   0.52   0.58   0.64   0.52   0.54   0.64   17.20
PRT    0.59   0.71   0.65   0.63   0.62   0.67   0.70   0.65   0.63   0.56   0.65   0.63   0.57   0.62   0.70   0.65   0.67   0.62   0.58   0.66   0.66   0.63   1.41
LVA    0.65   0.84   0.77   0.72   0.78   0.78   0.67   0.80   0.72   0.60   0.79   0.69   0.78   0.75   0.73   0.68   0.74   0.83   0.71   0.62   0.73   0.67   0.61   0.34

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HOL    ruh
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        AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT    LVA
AUS    0.41
BEL    0.83   1.25
CAN    0.77   0.91   5.40
CHE    0.81   0.91   0.93   11.20
DEU    0.81   0.89   0.88   0.88   13.07
DFS    0.77   0.91   0.86   0.91   0.95   11.58
ESP    0.81   0.87   0.83   0.86   0.91   0.91   0.80
FRA    0.77   0.89   0.85   0.88   0.90   0.93   0.89   1.07
GBR    0.77   0.83   0.73   0.81   0.85   0.90   0.87   0.88   1.37
ITA    0.71   0.75   0.70   0.73   0.82   0.85   0.88   0.83   0.84   1.26
NLD    0.74   0.83   0.75   0.83   0.92   0.92   0.90   0.87   0.88   0.83   4.36
USA    0.76   0.84   0.81   0.85   0.90   0.92   0.89   0.87   0.92   0.88   0.85   1.50
HUN    0.81   0.78   0.79   0.78   0.86   0.82   0.87   0.82   0.80   0.81   0.81   0.81   0.98
POL    0.71   0.82   0.71   0.76   0.82   0.85   0.86   0.83   0.81   0.82   0.84   0.79   0.79   10.28
NZL    0.80   0.82   0.74   0.83   0.83   0.87   0.84   0.85   0.91   0.80   0.83   0.90   0.82   0.77   0.39
ZAF    0.71   0.75   0.70   0.78   0.75   0.83   0.79   0.75   0.86   0.77   0.77   0.81   0.73   0.71   0.81   0.79
JPN    0.81   0.92   0.92   0.92   0.91   0.92   0.93   0.90   0.82   0.83   0.86   0.87   0.86   0.85   0.82   0.78   1.46
CZE    0.80   0.88   0.88   0.84   0.89   0.85   0.80   0.83   0.73   0.73   0.76   0.78   0.85   0.72   0.76   0.77   0.86   14.64
EST    0.72   0.80   0.81   0.77   0.83   0.84   0.85   0.82   0.76   0.79   0.77   0.84   0.84   0.79   0.79   0.74   0.85   0.81   17.49
IRL    0.72   0.75   0.70   0.73   0.78   0.82   0.83   0.82   0.91   0.85   0.82   0.89   0.77   0.76   0.83   0.78   0.76   0.71   0.77   1.03
KOR    0.72   0.83   0.84   0.76   0.72   0.71   0.75   0.71   0.70   0.71   0.71   0.71   0.71   0.71   0.69   0.71   0.83   0.78   0.74   0.71   3.45
SVN    0.73   0.91   0.86   0.82   0.87   0.87   0.83   0.85   0.73   0.76   0.82   0.77   0.74   0.75   0.71   0.70   0.86   0.85   0.82   0.71   0.79   15.34
PRT    0.72   0.78   0.70   0.71   0.79   0.83   0.84   0.80   0.86   0.83   0.81   0.81   0.76   0.80   0.76   0.76   0.78   0.71   0.72   0.80   0.70   0.77   1.26
LVA    0.70   0.74   0.71   0.71   0.78   0.74   0.73   0.70   0.71   0.69   0.74   0.72   0.69   0.69   0.70   0.70   0.74   0.71   0.70   0.70   0.70   0.76   0.69   0.43

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HOL    usu
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        AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT    LVA
AUS    0.35
BEL    0.64   1.50
CAN    0.77   0.77   5.62
CHE    0.76   0.87   0.91   11.90
DEU    0.73   0.79   0.92   0.93   11.58
DFS    0.70   0.86   0.80   0.90   0.83   11.60
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| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | NZL | ZAF | JPN | CZE | EST | IRL | KOR | SVN | PRT | LVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESP | 0.78 | 0.69 | 0.83 | 0.81 | 0.79 | 0.80 | 0.77 | | | | | | | | | | | | | | | | | |
| FRA | 0.74 | 0.86 | 0.78 | 0.86 | 0.75 | 0.91 | 0.82 | 1.07 | | | | | | | | | | | | | | | | |
| GBR | 0.81 | 0.65 | 0.80 | 0.80 | 0.75 | 0.82 | 0.91 | 0.88 | 1.36 | | | | | | | | | | | | | | | |
| ITA | 0.71 | 0.69 | 0.78 | 0.79 | 0.79 | 0.78 | 0.89 | 0.81 | 0.87 | 1.37 | | | | | | | | | | | | | | |
| NLD | 0.79 | 0.80 | 0.83 | 0.87 | 0.81 | 0.90 | 0.89 | 0.92 | 0.92 | 0.81 | 4.41 | | | | | | | | | | | | | |
| USA | 0.79 | 0.69 | 0.81 | 0.79 | 0.75 | 0.86 | 0.91 | 0.88 | 0.95 | 0.90 | 0.90 | 1.48 | | | | | | | | | | | | |
| HUN | 0.71 | 0.90 | 0.81 | 0.91 | 0.84 | 0.90 | 0.77 | 0.90 | 0.77 | 0.78 | 0.85 | 0.79 | 1.01 | | | | | | | | | | | |
| POL | 0.67 | 0.75 | 0.83 | 0.85 | 0.90 | 0.79 | 0.75 | 0.71 | 0.68 | 0.75 | 0.76 | 0.71 | 0.82 | 11.35 | | | | | | | | | | |
| NZL | 0.60 | 0.58 | 0.57 | 0.58 | 0.58 | 0.57 | 0.68 | 0.57 | 0.60 | 0.64 | 0.57 | 0.67 | 0.58 | 0.58 | 0.38 | | | | | | | | | |
| ZAF | 0.78 | 0.63 | 0.66 | 0.66 | 0.60 | 0.75 | 0.77 | 0.75 | 0.81 | 0.66 | 0.77 | 0.82 | 0.75 | 0.65 | 0.62 | 0.83 | | | | | | | | |
| JPN | 0.61 | 0.95 | 0.72 | 0.84 | 0.73 | 0.85 | 0.62 | 0.88 | 0.65 | 0.66 | 0.78 | 0.68 | 0.88 | 0.71 | 0.57 | 0.60 | 1.63 | | | | | | | |
| CZE | 0.59 | 0.88 | 0.80 | 0.86 | 0.87 | 0.77 | 0.65 | 0.71 | 0.61 | 0.69 | 0.70 | 0.63 | 0.88 | 0.86 | 0.57 | 0.59 | 0.82 | 14.12 | | | | | | |
| EST | 0.70 | 0.89 | 0.82 | 0.87 | 0.86 | 0.84 | 0.70 | 0.82 | 0.70 | 0.68 | 0.83 | 0.70 | 0.85 | 0.81 | 0.58 | 0.62 | 0.87 | 0.87 | 18.63 | | | | | |
| IRL | 0.79 | 0.69 | 0.83 | 0.80 | 0.78 | 0.75 | 0.87 | 0.80 | 0.91 | 0.87 | 0.84 | 0.87 | 0.75 | 0.75 | 0.70 | 0.75 | 0.64 | 0.67 | 0.70 | 1.07 | | | | |
| KOR | 0.63 | 0.69 | 0.84 | 0.75 | 0.81 | 0.68 | 0.73 | 0.62 | 0.61 | 0.74 | 0.66 | 0.69 | 0.73 | 0.81 | 0.58 | 0.65 | 0.64 | 0.76 | 0.64 | 0.68 | 2.62 | | | |
| SVN | 0.62 | 0.76 | 0.85 | 0.82 | 0.87 | 0.71 | 0.65 | 0.63 | 0.60 | 0.61 | 0.66 | 0.60 | 0.72 | 0.83 | 0.58 | 0.56 | 0.70 | 0.85 | 0.83 | 0.69 | 0.69 | 19.80 | | |
| PRT | 0.68 | 0.65 | 0.77 | 0.76 | 0.80 | 0.69 | 0.79 | 0.64 | 0.73 | 0.77 | 0.72 | 0.69 | 0.71 | 0.75 | 0.57 | 0.58 | 0.58 | 0.71 | 0.65 | 0.76 | 0.70 | 0.70 | 1.53 | |
| LVA | 0.58 | 0.58 | 0.64 | 0.64 | 0.61 | 0.65 | 0.73 | 0.69 | 0.75 | 0.67 | 0.68 | 0.69 | 0.63 | 0.64 | 0.64 | 0.59 | 0.58 | 0.58 | 0.59 | 0.72 | 0.57 | 0.58 | 0.64 | 0.30 |

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HOL    ude

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| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | ZAF | JPN | CZE | EST | IRL | KOR | SVN | PRT | LVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0.58 | | | | | | | | | | | | | | | | | | | | | | |
| BEL | 0.90 | 1.36 | | | | | | | | | | | | | | | | | | | | | |
| CAN | 0.88 | 0.96 | 5.18 | | | | | | | | | | | | | | | | | | | | |
| CHE | 0.93 | 0.95 | 0.96 | 11.83 | | | | | | | | | | | | | | | | | | | |
| DEU | 0.90 | 0.96 | 0.97 | 0.96 | 13.18 | | | | | | | | | | | | | | | | | | |
| DFS | 0.89 | 0.95 | 0.96 | 0.96 | 0.97 | 11.83 | | | | | | | | | | | | | | | | | |
| ESP | 0.89 | 0.97 | 0.98 | 0.96 | 0.96 | 0.97 | 1.05 | | | | | | | | | | | | | | | | |
| FRA | 0.91 | 0.97 | 0.97 | 0.98 | 0.98 | 0.97 | 0.97 | 1.11 | | | | | | | | | | | | | | | |
| GBR | 0.89 | 0.97 | 0.97 | 0.95 | 0.96 | 0.94 | 0.97 | 0.97 | 1.26 | | | | | | | | | | | | | | |
| ITA | 0.89 | 0.94 | 0.96 | 0.96 | 0.96 | 0.95 | 0.97 | 0.97 | 0.95 | 1.31 | | | | | | | | | | | | | |
| NLD | 0.90 | 0.96 | 0.97 | 0.97 | 0.98 | 0.96 | 0.97 | 0.97 | 0.97 | 0.95 | 4.85 | | | | | | | | | | | | |
| USA | 0.88 | 0.95 | 0.96 | 0.96 | 0.96 | 0.96 | 0.97 | 0.97 | 0.97 | 0.97 | 0.96 | 1.47 | | | | | | | | | | | |
| HUN | 0.88 | 0.95 | 0.97 | 0.95 | 0.95 | 0.95 | 0.96 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 1.01 | | | | | | | | | | |
| POL | 0.89 | 0.95 | 0.94 | 0.94 | 0.95 | 0.94 | 0.94 | 0.94 | 0.93 | 0.93 | 0.94 | 0.93 | 0.94 | 11.03 | | | | | | | | | |
| ZAF | 0.88 | 0.93 | 0.94 | 0.91 | 0.92 | 0.90 | 0.92 | 0.92 | 0.95 | 0.89 | 0.92 | 0.94 | 0.92 | 0.91 | 0.92 | | | | | | | | |
| JPN | 0.89 | 0.95 | 0.97 | 0.96 | 0.96 | 0.97 | 0.97 | 0.97 | 0.94 | 0.97 | 0.95 | 0.97 | 0.95 | 0.94 | 0.90 | 1.23 | | | | | | | |
| CZE | 0.89 | 0.96 | 0.97 | 0.94 | 0.96 | 0.93 | 0.95 | 0.94 | 0.95 | 0.94 | 0.95 | 0.93 | 0.96 | 0.93 | 0.93 | 0.93 | 13.58 | | | | | | |
| EST | 0.88 | 0.93 | 0.94 | 0.92 | 0.92 | 0.94 | 0.94 | 0.91 | 0.92 | 0.92 | 0.93 | 0.94 | 0.93 | 0.93 | 0.91 | 0.93 | 0.94 | 15.67 | | | | | |
| IRL | 0.89 | 0.93 | 0.90 | 0.91 | 0.89 | 0.88 | 0.91 | 0.91 | 0.96 | 0.89 | 0.92 | 0.93 | 0.88 | 0.89 | 0.95 | 0.89 | 0.89 | 0.88 | 1.29 | | | | |
| KOR | 0.88 | 0.88 | 0.88 | 0.89 | 0.88 | 0.89 | 0.91 | 0.89 | 0.87 | 0.88 | 0.88 | 0.90 | 0.89 | 0.88 | 0.88 | 0.91 | 0.88 | 0.88 | 0.88 | 4.66 | | | |
| SVN | 0.88 | 0.93 | 0.94 | 0.93 | 0.95 | 0.91 | 0.93 | 0.93 | 0.91 | 0.95 | 0.94 | 0.90 | 0.93 | 0.94 | 0.88 | 0.92 | 0.95 | 0.93 | 0.87 | 0.88 | 15.75 | | |
| PRT | 0.88 | 0.92 | 0.91 | 0.90 | 0.91 | 0.90 | 0.91 | 0.90 | 0.91 | 0.92 | 0.91 | 0.91 | 0.91 | 0.89 | 0.91 | 0.90 | 0.94 | 0.88 | 0.88 | 0.88 | 0.89 | 1.50 | |
| LVA | 0.87 | 0.87 | 0.87 | 0.87 | 0.88 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.36 |

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HOL    ftp

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| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | NZL | ZAF | JPN | CZE | EST | IRL | KOR | SVN | PRT | LVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0.61 | | | | | | | | | | | | | | | | | | | | | | | |
| BEL | 0.94 | 1.46 | | | | | | | | | | | | | | | | | | | | | | |
| CAN | 0.94 | 0.96 | 6.07 | | | | | | | | | | | | | | | | | | | | | |
| CHE | 0.96 | 0.97 | 0.98 | 11.92 | | | | | | | | | | | | | | | | | | | | |
| DEU | 0.94 | 0.95 | 0.98 | 0.97 | 13.88 | | | | | | | | | | | | | | | | | | | |
| DFS | 0.90 | 0.96 | 0.96 | 0.94 | 0.95 | 10.88 | | | | | | | | | | | | | | | | | | |
| ESP | 0.93 | 0.93 | 0.97 | 0.95 | 0.97 | 0.93 | 0.92 | | | | | | | | | | | | | | | | | |
| FRA | 0.93 | 0.99 | 0.97 | 0.97 | 0.95 | 0.95 | 0.92 | 1.10 | | | | | | | | | | | | | | | | |
| GBR | 0.92 | 0.90 | 0.96 | 0.93 | 0.95 | 0.91 | 0.96 | 0.89 | 1.36 | | | | | | | | | | | | | | | |
| ITA | 0.86 | 0.86 | 0.87 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 1.16 | | | | | | | | | | | | | | |
| NLD | 0.94 | 0.97 | 0.98 | 0.97 | 0.98 | 0.96 | 0.95 | 0.96 | 0.94 | 0.86 | 5.14 | | | | | | | | | | | | | |
| USA | 0.86 | 0.87 | 0.92 | 0.88 | 0.91 | 0.92 | 0.92 | 0.92 | 0.95 | 0.86 | 0.90 | 1.38 | | | | | | | | | | | | |
| HUN | 0.95 | 0.93 | 0.95 | 0.95 | 0.95 | 0.91 | 0.95 | 0.92 | 0.92 | 0.86 | 0.94 | 0.88 | 0.93 | | | | | | | | | | | |
| POL | 0.87 | 0.88 | 0.93 | 0.89 | 0.92 | 0.89 | 0.92 | 0.88 | 0.92 | 0.86 | 0.92 | 0.90 | 0.90 | 11.70 | | | | | | | | | | |
| NZL | 0.91 | 0.89 | 0.92 | 0.90 | 0.90 | 0.86 | 0.89 | 0.90 | 0.90 | 0.86 | 0.91 | 0.87 | 0.89 | 0.88 | 0.31 | | | | | | | | | |
| ZAF | 0.90 | 0.91 | 0.94 | 0.92 | 0.91 | 0.89 | 0.93 | 0.91 | 0.93 | 0.86 | 0.92 | 0.88 | 0.92 | 0.87 | 0.90 | 0.82 | | | | | | | | |
| JPN | 0.93 | 0.98 | 0.97 | 0.97 | 0.95 | 0.95 | 0.93 | 0.98 | 0.90 | 0.86 | 0.97 | 0.86 | 0.93 | 0.89 | 0.89 | 0.92 | 1.49 | | | | | | | |
| CZE | 0.94 | 0.95 | 0.96 | 0.96 | 0.95 | 0.92 | 0.95 | 0.94 | 0.92 | 0.86 | 0.96 | 0.87 | 0.96 | 0.91 | 0.90 | 0.92 | 0.95 | 13.09 | | | | | | |

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EST   0.94  0.94  0.95  0.95  0.94  0.91  0.93  0.93  0.91  0.86  0.95  0.86  0.93  0.90  0.87  0.89  0.95  0.95  18.89
IRL   0.90  0.87  0.93  0.90  0.92  0.88  0.92  0.87  0.96  0.86  0.91  0.89  0.88  0.87  0.87  0.90  0.87  0.87  0.89  1.31
KOR   0.88  0.91  0.90  0.91  0.89  0.90  0.90  0.90  0.86  0.86  0.89  0.86  0.91  0.86  0.86  0.89  0.92  0.90  0.89  0.85  3.21
SVN   0.93  0.94  0.96  0.95  0.97  0.94  0.96  0.93  0.93  0.86  0.96  0.89  0.94  0.88  0.86  0.87  0.93  0.93  0.92  0.91  0.87  15.46
PRT   0.89  0.89  0.92  0.90  0.93  0.87  0.93  0.87  0.92  0.86  0.91  0.87  0.92  0.91  0.86  0.87  0.89  0.91  0.90  0.88  0.86  0.93  1.49
LVA   0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.86  0.85  0.86  0.38
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HOL    ftl
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        AUS   BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   HUN   POL   ZAF   JPN   CZE   EST   IRL   KOR   SVN   PRT   LVA   NZL
AUS   0.78
BEL   0.93  1.42
CAN   0.95  0.92  5.15
CHE   0.93  0.97  0.91  11.33
DEU   0.94  0.98  0.95  0.97  13.56
DFS   0.93  0.97  0.92  0.98  0.98  10.85
ESP   0.93  0.98  0.93  0.96  0.98  0.97  1.09
FRA   0.94  0.90  0.98  0.89  0.93  0.91  0.91  1.07
GBR   0.95  0.97  0.95  0.95  0.98  0.95  0.97  0.94  1.31
ITA   0.89  0.92  0.93  0.90  0.94  0.92  0.92  0.92  0.95  1.39
NLD   0.93  0.98  0.93  0.97  0.98  0.98  0.98  0.91  0.97  0.91  4.94
USA   0.94  0.94  0.96  0.94  0.96  0.95  0.95  0.94  0.97  0.93  0.95  1.44
HUN   0.89  0.96  0.89  0.96  0.95  0.95  0.95  0.89  0.92  0.89  0.95  0.90  1.12
POL   0.92  0.96  0.90  0.96  0.97  0.97  0.96  0.89  0.95  0.92  0.96  0.94  0.96  11.18
ZAF   0.92  0.93  0.89  0.91  0.91  0.92  0.94  0.89  0.92  0.89  0.92  0.91  0.91  0.93  0.87
JPN   0.94  0.98  0.94  0.98  0.98  0.98  0.98  0.92  0.97  0.93  0.98  0.97  0.95  0.98  0.94  1.41
CZE   0.93  0.96  0.92  0.97  0.97  0.97  0.97  0.90  0.96  0.92  0.97  0.95  0.95  0.98  0.92  0.98  14.43
EST   0.92  0.94  0.90  0.94  0.96  0.96  0.94  0.89  0.92  0.91  0.94  0.91  0.94  0.97  0.89  0.95  0.96  16.02
IRL   0.92  0.94  0.94  0.91  0.95  0.92  0.93  0.93  0.97  0.92  0.93  0.94  0.89  0.91  0.89  0.93  0.93  0.90  1.73
KOR   0.90  0.93  0.89  0.93  0.92  0.93  0.94  0.89  0.92  0.89  0.93  0.91  0.92  0.92  0.90  0.94  0.92  0.90  0.89  4.31
SVN   0.89  0.95  0.89  0.94  0.95  0.94  0.95  0.89  0.95  0.92  0.96  0.91  0.93  0.94  0.90  0.95  0.94  0.92  0.91  0.90  17.40
PRT   0.89  0.95  0.91  0.93  0.95  0.95  0.94  0.89  0.94  0.92  0.95  0.93  0.91  0.94  0.89  0.95  0.95  0.93  0.92  0.90  0.91  1.84
LVA   0.89  0.89  0.91  0.89  0.90  0.89  0.89  0.91  0.89  0.89  0.89  0.89  0.89  0.89  0.89  0.89  0.89  0.89  0.89  0.89  0.89  0.89  0.46
NZL   0.94  0.91  0.93  0.89  0.92  0.90  0.91  0.93  0.93  0.90  0.92  0.91  0.89  0.89  0.88  0.90  0.89  0.89  0.92  0.89  0.88  0.89  0.88  0.55
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HOL    rtp
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        AUS   BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   POL   NZL   JPN   CZE   EST   IRL   KOR   SVN   PRT   ZAF   HUN   LVA
AUS   0.43
BEL   0.93  1.43
CAN   0.89  0.97  6.12
CHE   0.91  0.97  0.98  11.90
DEU   0.89  0.96  0.97  0.97  14.06
DFS   0.87  0.94  0.95  0.94  0.96  11.06
ESP   0.89  0.96  0.97  0.96  0.97  0.96  0.88
FRA   0.90  0.97  0.98  0.98  0.97  0.96  0.97  1.05
GBR   0.91  0.96  0.97  0.96  0.97  0.95  0.97  0.98  1.45
ITA   0.87  0.89  0.89  0.89  0.92  0.91  0.91  0.91  0.90  1.29
NLD   0.90  0.96  0.98  0.97  0.98  0.97  0.98  0.98  0.98  0.91  5.07
USA   0.89  0.94  0.95  0.93  0.95  0.97  0.96  0.94  0.97  0.90  0.96  1.59
POL   0.87  0.93  0.94  0.92  0.96  0.93  0.95  0.93  0.93  0.90  0.95  0.91  11.23
NZL   0.91  0.95  0.95  0.94  0.94  0.89  0.93  0.95  0.95  0.86  0.94  0.90  0.92  0.47
JPN   0.91  0.97  0.98  0.97  0.96  0.96  0.97  0.97  0.96  0.91  0.98  0.96  0.94  0.93  1.57
CZE   0.89  0.97  0.95  0.95  0.95  0.94  0.94  0.95  0.95  0.90  0.95  0.94  0.95  0.92  0.95  14.44
EST   0.91  0.95  0.94  0.95  0.95  0.91  0.94  0.95  0.94  0.89  0.96  0.91  0.93  0.91  0.94  0.94  16.46
IRL   0.88  0.94  0.94  0.92  0.93  0.92  0.93  0.94  0.94  0.87  0.93  0.91  0.90  0.93  0.93  0.89  0.89  1.27
KOR   0.87  0.92  0.94  0.93  0.93  0.94  0.96  0.93  0.91  0.91  0.94  0.92  0.91  0.90  0.95  0.88  0.90  0.89  2.17
SVN   0.87  0.92  0.94  0.94  0.95  0.92  0.95  0.94  0.94  0.90  0.95  0.90  0.94  0.91  0.91  0.92  0.93  0.91  0.92  14.05
PRT   0.87  0.89  0.90  0.88  0.91  0.89  0.91  0.89  0.92  0.87  0.89  0.90  0.91  0.87  0.90  0.89  0.88  0.87  0.87  0.91  1.50
ZAF   0.89  0.87  0.87  0.87  0.87  0.87  0.87  0.87  0.87  0.87  0.87  0.87  0.87  0.86  0.87  0.87  0.87  0.87  0.87  0.87  0.87  0.56
HUN   0.89  0.95  0.94  0.94  0.96  0.95  0.96  0.96  0.96  0.90  0.96  0.95  0.96  0.92  0.95  0.95  0.94  0.90  0.90  0.94  0.90  0.87  1.06
LVA   0.86  0.92  0.91  0.91  0.90  0.90  0.92  0.92  0.91  0.88  0.93  0.87  0.92  0.88  0.91  0.92  0.94  0.86  0.89  0.92  0.89  0.86  0.92  0.44
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        AUS   BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   HUN   POL   NZL   JPN   CZE   EST   IRL   KOR   SVN   PRT
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| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | NZL | JPN | CZE | EST | IRL | KOR | SVN | PRT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0.97 | | | | | | | | | | | | | | | | | | | | | |
| BEL | 0.57 | 1.24 | | | | | | | | | | | | | | | | | | | | |
| CAN | 0.61 | 0.68 | 4.73 | | | | | | | | | | | | | | | | | | | |
| CHE | 0.60 | 0.78 | 0.84 | 11.18 | | | | | | | | | | | | | | | | | | |
| DEU | 0.57 | 0.67 | 0.77 | 0.85 | 12.90 | | | | | | | | | | | | | | | | | |
| DFS | 0.64 | 0.67 | 0.71 | 0.81 | 0.87 | 10.20 | | | | | | | | | | | | | | | | |
| ESP | 0.65 | 0.68 | 0.75 | 0.81 | 0.87 | 0.87 | 0.79 | | | | | | | | | | | | | | | |
| FRA | 0.56 | 0.75 | 0.70 | 0.88 | 0.87 | 0.87 | 0.88 | 1.09 | | | | | | | | | | | | | | |
| GBR | 0.66 | 0.71 | 0.77 | 0.90 | 0.91 | 0.87 | 0.86 | 0.88 | 1.02 | | | | | | | | | | | | | |
| ITA | 0.52 | 0.70 | 0.72 | 0.83 | 0.82 | 0.81 | 0.85 | 0.87 | 0.82 | 0.79 | | | | | | | | | | | | |
| NLD | 0.58 | 0.68 | 0.72 | 0.82 | 0.89 | 0.88 | 0.86 | 0.85 | 0.88 | 0.79 | 2.88 | | | | | | | | | | | |
| USA | 0.60 | 0.66 | 0.75 | 0.86 | 0.88 | 0.88 | 0.86 | 0.86 | 0.89 | 0.83 | 0.86 | 0.89 | | | | | | | | | | |
| HUN | 0.56 | 0.72 | 0.70 | 0.79 | 0.81 | 0.73 | 0.75 | 0.78 | 0.81 | 0.78 | 0.72 | 0.76 | 1.03 | | | | | | | | | |
| POL | 0.44 | 0.65 | 0.58 | 0.61 | 0.60 | 0.64 | 0.63 | 0.68 | 0.59 | 0.68 | 0.62 | 0.62 | 0.61 | 10.74 | | | | | | | | |
| NZL | 0.77 | 0.47 | 0.63 | 0.62 | 0.62 | 0.59 | 0.61 | 0.54 | 0.71 | 0.49 | 0.64 | 0.67 | 0.56 | 0.40 | 0.30 | | | | | | | |
| JPN | 0.56 | 0.80 | 0.77 | 0.92 | 0.76 | 0.76 | 0.78 | 0.82 | 0.78 | 0.81 | 0.77 | 0.81 | 0.72 | 0.67 | 0.50 | 0.59 | | | | | | |
| CZE | 0.61 | 0.70 | 0.79 | 0.81 | 0.85 | 0.75 | 0.78 | 0.77 | 0.80 | 0.74 | 0.77 | 0.78 | 0.82 | 0.60 | 0.65 | 0.71 | 13.25 | | | | | |
| EST | 0.53 | 0.66 | 0.66 | 0.66 | 0.73 | 0.68 | 0.64 | 0.69 | 0.64 | 0.62 | 0.71 | 0.62 | 0.71 | 0.62 | 0.48 | 0.66 | 0.73 | 18.95 | | | | |
| IRL | 0.58 | 0.50 | 0.65 | 0.68 | 0.69 | 0.65 | 0.66 | 0.61 | 0.79 | 0.63 | 0.62 | 0.64 | 0.63 | 0.45 | 0.56 | 0.56 | 0.64 | 0.54 | 0.89 | | | |
| KOR | 0.55 | 0.61 | 0.58 | 0.63 | 0.64 | 0.61 | 0.67 | 0.67 | 0.59 | 0.67 | 0.63 | 0.64 | 0.61 | 0.64 | 0.42 | 0.63 | 0.61 | 0.65 | 0.45 | 6.44 | | |
| SVN | 0.49 | 0.74 | 0.60 | 0.65 | 0.74 | 0.69 | 0.63 | 0.68 | 0.67 | 0.70 | 0.66 | 0.65 | 0.62 | 0.61 | 0.44 | 0.66 | 0.64 | 0.75 | 0.52 | 0.63 | 16.41 | |
| PRT | 0.55 | 0.67 | 0.65 | 0.71 | 0.79 | 0.77 | 0.77 | 0.77 | 0.81 | 0.77 | 0.77 | 0.76 | 0.69 | 0.65 | 0.48 | 0.75 | 0.71 | 0.61 | 0.60 | 0.65 | 0.61 | 0.28 |

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| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | NZL | JPN | CZE | EST | IRL | SVN | PRT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 1.29 | | | | | | | | | | | | | | | | | | | | |
| BEL | 0.67 | 1.31 | | | | | | | | | | | | | | | | | | | |
| CAN | 0.70 | 0.80 | 5.85 | | | | | | | | | | | | | | | | | | |
| CHE | 0.80 | 0.85 | 0.94 | 11.78 | | | | | | | | | | | | | | | | | |
| DEU | 0.75 | 0.79 | 0.89 | 0.92 | 13.65 | | | | | | | | | | | | | | | | |
| DFS | 0.65 | 0.83 | 0.87 | 0.90 | 0.86 | 13.02 | | | | | | | | | | | | | | | |
| ESP | 0.75 | 0.69 | 0.78 | 0.88 | 0.84 | 0.76 | 0.87 | | | | | | | | | | | | | | |
| FRA | 0.68 | 0.82 | 0.87 | 0.94 | 0.90 | 0.91 | 0.82 | 1.02 | | | | | | | | | | | | | |
| GBR | 0.83 | 0.69 | 0.78 | 0.87 | 0.83 | 0.70 | 0.88 | 0.75 | 1.42 | | | | | | | | | | | | |
| ITA | 0.68 | 0.79 | 0.84 | 0.93 | 0.87 | 0.88 | 0.84 | 0.91 | 0.81 | 1.18 | | | | | | | | | | | |
| NLD | 0.67 | 0.82 | 0.88 | 0.94 | 0.92 | 0.89 | 0.82 | 0.94 | 0.76 | 0.87 | 4.52 | | | | | | | | | | |
| USA | 0.74 | 0.74 | 0.88 | 0.92 | 0.86 | 0.78 | 0.86 | 0.82 | 0.88 | 0.85 | 0.84 | 1.19 | | | | | | | | | |
| HUN | 0.70 | 0.78 | 0.81 | 0.86 | 0.85 | 0.79 | 0.81 | 0.81 | 0.76 | 0.77 | 0.77 | 0.77 | 1.16 | | | | | | | | |
| POL | 0.69 | 0.79 | 0.72 | 0.78 | 0.77 | 0.71 | 0.70 | 0.73 | 0.76 | 0.73 | 0.71 | 0.72 | 0.72 | 11.21 | | | | | | | |
| NZL | 0.81 | 0.70 | 0.82 | 0.88 | 0.79 | 0.69 | 0.78 | 0.79 | 0.84 | 0.74 | 0.80 | 0.88 | 0.74 | 0.71 | 0.42 | | | | | | |
| JPN | 0.76 | 0.81 | 0.89 | 0.94 | 0.89 | 0.80 | 0.80 | 0.85 | 0.84 | 0.88 | 0.85 | 0.89 | 0.79 | 0.81 | 0.82 | 0.74 | | | | | |
| CZE | 0.70 | 0.86 | 0.87 | 0.91 | 0.93 | 0.90 | 0.80 | 0.92 | 0.75 | 0.86 | 0.88 | 0.80 | 0.88 | 0.75 | 0.75 | 0.85 | 13.06 | | | | |
| EST | 0.70 | 0.82 | 0.84 | 0.89 | 0.85 | 0.91 | 0.78 | 0.90 | 0.74 | 0.86 | 0.87 | 0.77 | 0.80 | 0.69 | 0.77 | 0.77 | 0.88 | 16.32 | | | |
| IRL | 0.81 | 0.65 | 0.69 | 0.79 | 0.75 | 0.63 | 0.80 | 0.66 | 0.95 | 0.76 | 0.68 | 0.82 | 0.69 | 0.71 | 0.81 | 0.76 | 0.70 | 0.70 | 0.93 | | |
| SVN | 0.68 | 0.75 | 0.69 | 0.72 | 0.70 | 0.69 | 0.69 | 0.69 | 0.69 | 0.68 | 0.69 | 0.69 | 0.69 | 0.79 | 0.67 | 0.70 | 0.69 | 0.70 | 0.66 | 17.03 | |
| PRT | 0.68 | 0.68 | 0.76 | 0.78 | 0.75 | 0.68 | 0.76 | 0.72 | 0.80 | 0.74 | 0.74 | 0.78 | 0.68 | 0.71 | 0.73 | 0.79 | 0.73 | 0.69 | 0.74 | 0.69 | 0.43 |

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| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | JPN | CZE | EST | IRL | SVN | PRT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0.77 | | | | | | | | | | | | | | | | | | | |
| BEL | 0.63 | 1.73 | | | | | | | | | | | | | | | | | | |
| CAN | 0.34 | 0.63 | 4.74 | | | | | | | | | | | | | | | | | |
| CHE | 0.55 | 0.76 | 0.80 | 11.49 | | | | | | | | | | | | | | | | |
| DEU | 0.38 | 0.76 | 0.71 | 0.78 | 11.77 | | | | | | | | | | | | | | | |
| DFS | 0.35 | 0.64 | 0.79 | 0.76 | 0.80 | 13.07 | | | | | | | | | | | | | | |
| ESP | 0.41 | 0.71 | 0.74 | 0.76 | 0.71 | 0.82 | 0.89 | | | | | | | | | | | | | |
| FRA | 0.52 | 0.81 | 0.67 | 0.75 | 0.76 | 0.61 | 0.75 | 1.06 | | | | | | | | | | | | |
| GBR | 0.50 | 0.74 | 0.66 | 0.79 | 0.73 | 0.72 | 0.79 | 0.84 | 1.56 | | | | | | | | | | | |
| ITA | 0.49 | 0.72 | 0.58 | 0.70 | 0.72 | 0.59 | 0.70 | 0.80 | 0.67 | 1.62 | | | | | | | | | | |
| NLD | 0.42 | 0.82 | 0.67 | 0.69 | 0.75 | 0.64 | 0.65 | 0.81 | 0.73 | 0.67 | 4.71 | | | | | | | | | |
| USA | 0.49 | 0.71 | 0.60 | 0.77 | 0.74 | 0.67 | 0.74 | 0.71 | 0.73 | 0.77 | 0.67 | 1.51 | | | | | | | | |
| HUN | 0.56 | 0.77 | 0.56 | 0.62 | 0.70 | 0.59 | 0.59 | 0.75 | 0.64 | 0.72 | 0.67 | 0.70 | 1.19 | | | | | | | |
| POL | 0.47 | 0.69 | 0.56 | 0.67 | 0.67 | 0.59 | 0.59 | 0.66 | 0.58 | 0.70 | 0.59 | 0.73 | 0.71 | 13.59 | | | | | | |
| JPN | 0.44 | 0.64 | 0.64 | 0.78 | 0.78 | 0.73 | 0.70 | 0.61 | 0.61 | 0.72 | 0.60 | 0.85 | 0.62 | 0.74 | 0.54 | | | | | |
| CZE | 0.47 | 0.75 | 0.62 | 0.72 | 0.78 | 0.63 | 0.66 | 0.69 | 0.64 | 0.78 | 0.63 | 0.83 | 0.80 | 0.82 | 0.80 | 17.29 | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EST | 0.45 | 0.62 | 0.58 | 0.62 | 0.64 | 0.61 | 0.60 | 0.64 | 0.60 | 0.60 | 0.68 | 0.60 | 0.68 | 0.60 | 0.62 | 0.69 | 20.71 | | |
| IRL | 0.56 | 0.72 | 0.60 | 0.78 | 0.68 | 0.65 | 0.69 | 0.67 | 0.78 | 0.66 | 0.62 | 0.66 | 0.65 | 0.59 | 0.68 | 0.63 | 0.43 | 1.35 | |
| SVN | 0.42 | 0.79 | 0.58 | 0.67 | 0.70 | 0.65 | 0.63 | 0.70 | 0.60 | 0.69 | 0.71 | 0.78 | 0.85 | 0.77 | 0.75 | 0.82 | 0.75 | 0.62 | 23.78 |
| PRT | 0.35 | 0.58 | 0.56 | 0.58 | 0.60 | 0.58 | 0.61 | 0.68 | 0.62 | 0.66 | 0.62 | 0.61 | 0.65 | 0.58 | 0.58 | 0.61 | 0.69 | 0.48 | 0.65 |

(PRT continues: 0.19)

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| | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | CZE | IRL | KOR | SVN | PRT | EST | HUN | POL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BEL | 1.81 | | | | | | | | | | | | | | | | | | |
| CAN | 0.85 | 6.74 | | | | | | | | | | | | | | | | | |
| CHE | 0.56 | 0.63 | 12.40 | | | | | | | | | | | | | | | | |
| DEU | 0.67 | 0.74 | 0.69 | 11.61 | | | | | | | | | | | | | | | |
| DFS | 0.88 | 0.91 | 0.51 | 0.69 | 13.23 | | | | | | | | | | | | | | |
| ESP | 0.63 | 0.74 | 0.69 | 0.74 | 0.74 | 0.96 | | | | | | | | | | | | | |
| FRA | 0.80 | 0.79 | 0.72 | 0.84 | 0.70 | 0.77 | 1.06 | | | | | | | | | | | | |
| GBR | 0.67 | 0.69 | 0.89 | 0.82 | 0.65 | 0.79 | 0.86 | 1.51 | | | | | | | | | | | |
| ITA | 0.62 | 0.69 | 0.65 | 0.74 | 0.60 | 0.75 | 0.79 | 0.73 | 1.91 | | | | | | | | | | |
| NLD | 0.85 | 0.82 | 0.69 | 0.82 | 0.78 | 0.70 | 0.82 | 0.78 | 0.64 | 4.32 | | | | | | | | | |
| USA | 0.66 | 0.78 | 0.50 | 0.78 | 0.73 | 0.73 | 0.76 | 0.69 | 0.75 | 0.68 | 1.58 | | | | | | | | |
| CZE | 0.51 | 0.62 | 0.55 | 0.63 | 0.61 | 0.64 | 0.64 | 0.66 | 0.69 | 0.50 | 0.63 | 20.58 | | | | | | | |
| IRL | 0.59 | 0.56 | 0.51 | 0.64 | 0.52 | 0.63 | 0.69 | 0.72 | 0.61 | 0.62 | 0.56 | 0.51 | 1.64 | | | | | | |
| KOR | 0.57 | 0.63 | 0.53 | 0.51 | 0.57 | 0.65 | 0.66 | 0.52 | 0.55 | 0.55 | 0.52 | 0.55 | 0.51 | 10.51 | | | | | |
| SVN | 0.75 | 0.68 | 0.57 | 0.69 | 0.70 | 0.69 | 0.77 | 0.67 | 0.67 | 0.60 | 0.65 | 0.70 | 0.53 | 0.56 | 28.99 | | | | |
| PRT | 0.50 | 0.50 | 0.54 | 0.60 | 0.50 | 0.59 | 0.53 | 0.60 | 0.58 | 0.51 | 0.50 | 0.64 | 0.50 | 0.51 | 0.68 | 2.12 | | | |
| EST | 0.55 | 0.53 | 0.52 | 0.52 | 0.52 | 0.53 | 0.53 | 0.53 | 0.52 | 0.51 | 0.51 | 0.53 | 0.52 | 0.68 | 0.66 | 0.53 | 22.52 | | |
| HUN | 0.69 | 0.70 | 0.51 | 0.67 | 0.72 | 0.61 | 0.75 | 0.68 | 0.64 | 0.66 | 0.65 | 0.82 | 0.51 | 0.65 | 0.74 | 0.57 | 0.60 | 1.18 | |
| POL | 0.51 | 0.55 | 0.51 | 0.65 | 0.50 | 0.55 | 0.66 | 0.55 | 0.62 | 0.50 | 0.68 | 0.72 | 0.50 | 0.51 | 0.76 | 0.50 | 0.53 | 0.66 | 15.78 |

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| | BEL | CHE | DEU | DFS | FRA | GBR | ITA | NLD | USA | CZE | JPN | IRL | KOR | CAN | PRT | ESP | SVN | EST | HUN | NZL | POL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BEL | 0.99 | | | | | | | | | | | | | | | | | | | | |
| CHE | 0.72 | 11.76 | | | | | | | | | | | | | | | | | | | |
| DEU | 0.72 | 0.90 | 13.40 | | | | | | | | | | | | | | | | | | |
| DFS | 0.77 | 0.90 | 0.95 | 12.18 | | | | | | | | | | | | | | | | | |
| FRA | 0.74 | 0.93 | 0.95 | 0.95 | 0.99 | | | | | | | | | | | | | | | | |
| GBR | 0.76 | 0.91 | 0.90 | 0.90 | 0.93 | 1.61 | | | | | | | | | | | | | | | |
| ITA | 0.72 | 0.91 | 0.95 | 0.95 | 0.96 | 0.90 | 6.65 | | | | | | | | | | | | | | |
| NLD | 0.72 | 0.93 | 0.95 | 0.95 | 0.95 | 0.91 | 0.94 | 5.01 | | | | | | | | | | | | | |
| USA | 0.77 | 0.72 | 0.80 | 0.80 | 0.80 | 0.76 | 0.77 | 0.76 | 1.38 | | | | | | | | | | | | |
| CZE | 0.74 | 0.87 | 0.96 | 0.95 | 0.92 | 0.89 | 0.94 | 0.93 | 0.76 | 13.83 | | | | | | | | | | | |
| JPN | 0.81 | 0.92 | 0.97 | 0.97 | 0.97 | 0.92 | 0.96 | 0.95 | 0.84 | 0.95 | 1.70 | | | | | | | | | | |
| IRL | 0.72 | 0.87 | 0.79 | 0.85 | 0.88 | 0.93 | 0.83 | 0.85 | 0.72 | 0.77 | 0.86 | 1.00 | | | | | | | | | |
| KOR | 0.73 | 0.75 | 0.85 | 0.86 | 0.86 | 0.81 | 0.85 | 0.80 | 0.74 | 0.86 | 0.87 | 0.73 | 2.46 | | | | | | | | |
| CAN | 0.74 | 0.93 | 0.96 | 0.94 | 0.95 | 0.95 | 0.94 | 0.95 | 0.81 | 0.94 | 0.98 | 0.87 | 0.84 | 6.02 | | | | | | | |
| PRT | 0.72 | 0.86 | 0.87 | 0.86 | 0.89 | 0.87 | 0.84 | 0.86 | 0.72 | 0.83 | 0.87 | 0.81 | 0.83 | 0.88 | 1.82 | | | | | | |
| ESP | 0.74 | 0.88 | 0.92 | 0.93 | 0.95 | 0.93 | 0.92 | 0.91 | 0.75 | 0.91 | 0.94 | 0.83 | 0.87 | 0.95 | 0.88 | 1.03 | | | | | |
| SVN | 0.73 | 0.88 | 0.91 | 0.91 | 0.89 | 0.81 | 0.89 | 0.91 | 0.73 | 0.90 | 0.89 | 0.75 | 0.78 | 0.85 | 0.75 | 0.85 | 21.31 | | | | |
| EST | 0.73 | 0.83 | 0.89 | 0.87 | 0.87 | 0.76 | 0.86 | 0.90 | 0.82 | 0.86 | 0.87 | 0.73 | 0.74 | 0.84 | 0.74 | 0.78 | 0.87 | 16.51 | | | |
| HUN | 0.73 | 0.87 | 0.94 | 0.92 | 0.93 | 0.87 | 0.94 | 0.89 | 0.75 | 0.95 | 0.93 | 0.76 | 0.85 | 0.93 | 0.84 | 0.91 | 0.86 | 0.82 | 0.99 | | |
| NZL | 0.71 | 0.90 | 0.92 | 0.92 | 0.93 | 0.92 | 0.91 | 0.88 | 0.74 | 0.89 | 0.92 | 0.88 | 0.80 | 0.92 | 0.85 | 0.88 | 0.84 | 0.81 | 0.89 | 0.16 | |
| POL | 0.74 | 0.86 | 0.92 | 0.89 | 0.91 | 0.89 | 0.91 | 0.87 | 0.75 | 0.92 | 0.92 | 0.80 | 0.79 | 0.91 | 0.86 | 0.88 | 0.85 | 0.78 | 0.91 | 0.85 | 11.23 |

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| | AUS | CAN | DFS | GBR | ITA | NZL | USA | ZAF | NLD | CHE |
|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0.54 | | | | | | | | | |
| CAN | 0.89 | 6.77 | | | | | | | | |
| DFS | 0.91 | 0.96 | 11.78 | | | | | | | |
| GBR | 0.91 | 0.96 | 0.94 | 1.08 | | | | | | |
| ITA | 0.89 | 0.94 | 0.93 | 0.94 | 1.43 | | | | | |
| NZL | 0.87 | 0.84 | 0.85 | 0.90 | 0.85 | 0.36 | | | | |
| USA | 0.90 | 0.97 | 0.95 | 0.96 | 0.93 | 0.88 | 1.67 | | | |
| ZAF | 0.87 | 0.85 | 0.85 | 0.92 | 0.85 | 0.89 | 0.86 | 8.83 | | |
| NLD | 0.89 | 0.95 | 0.97 | 0.94 | 0.92 | 0.85 | 0.93 | 0.87 | 5.22 | |
| CHE | 0.90 | 0.96 | 0.96 | 0.95 | 0.93 | 0.85 | 0.94 | 0.87 | 0.97 | 11.04 |

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JER    cwi
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        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.29
CAN     0.73    6.57
DFS     0.74    0.83   15.67
GBR     0.81    0.91    0.85    1.83
ITA     0.65    0.80    0.71    0.74    1.63
NZL     0.80    0.71    0.67    0.76    0.66    0.37
USA     0.73    0.90    0.81    0.84    0.91    0.67    1.03
ZAF     0.69    0.79    0.72    0.82    0.76    0.77    0.78    8.60
NLD     0.74    0.91    0.89    0.90    0.72    0.70    0.83    0.81    4.49
CHE     0.67    0.87    0.86    0.83    0.83    0.68    0.87    0.72    0.86   12.29

-------------------------------------------------------------------------------
JER    bde
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     ZAF     NLD     USA     CHE
AUS     0.33
CAN     0.75    5.66
DFS     0.77    0.86   13.66
GBR     0.74    0.85    0.85    1.54
ITA     0.70    0.74    0.77    0.83    1.61
NZL     0.78    0.69    0.70    0.69    0.70    0.37
ZAF     0.80    0.73    0.83    0.81    0.72    0.77    8.78
NLD     0.70    0.82    0.84    0.89    0.87    0.70    0.78    4.75
USA     0.69    0.70    0.74    0.77    0.91    0.69    0.72    0.87    1.03
CHE     0.76    0.87    0.91    0.89    0.85    0.71    0.82    0.90    0.85   13.58

-------------------------------------------------------------------------------
JER    ang
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE
AUS     0.34
CAN     0.66    7.54
DFS     0.70    0.82   13.26
GBR     0.79    0.81    0.86    1.23
ITA     0.69    0.83    0.83    0.86    1.60
USA     0.70    0.83    0.86    0.83    0.77    1.03
ZAF     0.62    0.63    0.67    0.80    0.72    0.67    8.71
NLD     0.72    0.82    0.73    0.82    0.78    0.73    0.65    6.23
CHE     0.63    0.80    0.71    0.72    0.74    0.72    0.65    0.74    9.59

-------------------------------------------------------------------------------
JER    ran
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.36
CAN     0.89    5.82
DFS     0.90    0.97   11.56
GBR     0.94    0.95    0.95    1.20
ITA     0.89    0.95    0.94    0.94    1.32
NZL     0.90    0.88    0.88    0.92    0.88    0.30
USA     0.90    0.95    0.96    0.97    0.93    0.91    1.24
ZAF     0.89    0.89    0.89    0.90    0.88    0.88    0.89    9.02
NLD     0.90    0.96    0.96    0.96    0.94    0.89    0.95    0.92    4.74
CHE     0.91    0.96    0.96    0.95    0.94    0.89    0.94    0.90    0.95   12.96

-------------------------------------------------------------------------------
JER    rwi
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.32
CAN     0.81    6.38
DFS     0.81    0.91   12.11
GBR     0.80    0.92    0.85    1.38
ITA     0.78    0.85    0.82    0.85    1.77
```

```
NZL     0.88    0.83    0.82    0.80    0.79    0.30
USA     0.78    0.82    0.82    0.84    0.85    0.78    1.00
ZAF     0.78    0.79    0.79    0.80    0.79    0.77    0.79    9.24
NLD     0.85    0.94    0.91    0.88    0.80    0.85    0.81    0.80    5.02
CHE     0.83    0.93    0.84    0.87    0.80    0.81    0.80    0.79    0.92   12.01


----------------------------------------------------------------------------------------
JER    rls
----------------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.18
CAN     0.67    6.13
DFS     0.69    0.91   12.65
GBR     0.72    0.85    0.76    1.75
ITA     0.68    0.83    0.82    0.77    1.98
NZL     0.66    0.67    0.67    0.69    0.68    0.12
USA     0.68    0.94    0.89    0.88    0.82    0.66    0.89
ZAF     0.72    0.68    0.68    0.77    0.73    0.83    0.74   11.88
NLD     0.73    0.92    0.91    0.85    0.85    0.67    0.87    0.74    3.56
CHE     0.76    0.92    0.85    0.82    0.80    0.69    0.86    0.72    0.90    9.21


----------------------------------------------------------------------------------------
JER    rlr
----------------------------------------------------------------------------------------
        AUS     CAN     DFS     ITA     ZAF     NLD     USA     CHE
AUS     0.21
CAN     0.52    6.55
DFS     0.54    0.77   13.64
ITA     0.55    0.81    0.65    1.29
ZAF     0.52    0.56    0.53    0.61   12.70
NLD     0.57    0.86    0.88    0.73    0.63    4.64
USA     0.51    0.73    0.64    0.82    0.53    0.74    0.89
CHE     0.65    0.68    0.63    0.62    0.55    0.70    0.58   12.30


----------------------------------------------------------------------------------------
JER    fan
----------------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE
AUS     0.22
CAN     0.62    6.20
DFS     0.63    0.87   12.77
GBR     0.72    0.79    0.75    1.51
ITA     0.63    0.76    0.69    0.76    2.01
USA     0.63    0.88    0.80    0.85    0.84    0.89
ZAF     0.66    0.65    0.68    0.84    0.66    0.75    9.66
NLD     0.68    0.75    0.78    0.86    0.72    0.77    0.71    3.93
CHE     0.66    0.79    0.80    0.69    0.68    0.71    0.67    0.73   12.07


----------------------------------------------------------------------------------------
JER    fua
----------------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.37
CAN     0.74    5.73
DFS     0.72    0.86   12.83
GBR     0.76    0.94    0.86    1.64
ITA     0.68    0.86    0.77    0.87    1.49
NZL     0.79    0.72    0.74    0.81    0.70    0.42
USA     0.75    0.94    0.87    0.92    0.90    0.72    1.48
ZAF     0.72    0.91    0.87    0.93    0.82    0.74    0.89   11.85
NLD     0.76    0.92    0.89    0.92    0.83    0.82    0.87    0.87    4.72
CHE     0.79    0.91    0.85    0.87    0.82    0.71    0.86    0.88    0.90   11.67


----------------------------------------------------------------------------------------
JER    ruh
----------------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.35
CAN     0.73    6.90
```

```
DFS     0.74    0.84   10.67
GBR     0.80    0.80    0.82    1.34
ITA     0.74    0.76    0.81    0.85    1.73
NZL     0.72    0.72    0.76    0.76    0.78    0.41
USA     0.77    0.84    0.89    0.91    0.84    0.74    1.26
ZAF     0.82    0.73    0.79    0.87    0.82    0.77    0.85    9.21
NLD     0.75    0.76    0.91    0.88    0.83    0.82    0.86    0.78    4.22
CHE     0.79    0.92    0.86    0.83    0.77    0.77    0.85    0.77    0.83   12.98

-------------------------------------------------------------------------------
JER    usu
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.38
CAN     0.75    6.40
DFS     0.71    0.85   13.46
GBR     0.79    0.87    0.85    1.74
ITA     0.65    0.78    0.74    0.84    1.87
NZL     0.59    0.59    0.59    0.64    0.68    0.40
USA     0.73    0.83    0.88    0.84    0.82    0.60    0.99
ZAF     0.77    0.79    0.73    0.81    0.64    0.59    0.77   10.06
NLD     0.81    0.83    0.88    0.91    0.80    0.60    0.88    0.79    4.90
CHE     0.75    0.90    0.86    0.80    0.79    0.61    0.83    0.77    0.86    9.98

-------------------------------------------------------------------------------
JER    ude
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE
AUS     0.34
CAN     0.91    5.36
DFS     0.89    0.93   12.18
GBR     0.89    0.97    0.92    1.46
ITA     0.91    0.94    0.94    0.92    1.42
USA     0.89    0.96    0.95    0.94    0.95    1.77
ZAF     0.88    0.89    0.91    0.91    0.89    0.89   10.44
NLD     0.90    0.96    0.95    0.96    0.95    0.95    0.91    4.14
CHE     0.94    0.95    0.94    0.92    0.95    0.94    0.90    0.96    9.80

-------------------------------------------------------------------------------
JER    ftp
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.46
CAN     0.89    6.43
DFS     0.88    0.92   12.78
GBR     0.90    0.94    0.89    1.36
ITA     0.87    0.87    0.86    0.86    2.03
NZL     0.87    0.92    0.87    0.88    0.87    0.30
USA     0.86    0.95    0.91    0.93    0.87    0.88    1.33
ZAF     0.87    0.93    0.88    0.93    0.87    0.90    0.90   10.17
NLD     0.93    0.97    0.94    0.94    0.86    0.90    0.90    0.90    5.59
CHE     0.92    0.95    0.92    0.90    0.87    0.88    0.90    0.88    0.96    9.98

-------------------------------------------------------------------------------
JER    ftl
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE     NZL
AUS     0.32
CAN     0.91    5.61
DFS     0.92    0.91   13.85
GBR     0.92    0.93    0.94    1.48
ITA     0.90    0.92    0.91    0.93    1.86
USA     0.90    0.92    0.94    0.97    0.92    1.11
ZAF     0.92    0.91    0.92    0.95    0.90    0.96   10.93
NLD     0.93    0.93    0.97    0.97    0.91    0.95    0.93    4.60
CHE     0.92    0.92    0.94    0.96    0.90    0.94    0.93    0.96   11.50
NZL     0.92    0.94    0.92    0.94    0.91    0.93    0.93    0.92    0.92    0.53

-------------------------------------------------------------------------------
```

```
JER    rtp
----------------------------------------------------------------------------------------
          AUS     CAN     DFS     NZL     ZAF     NLD     USA     CHE
AUS      0.32
CAN      0.87    6.33
DFS      0.88    0.94   13.18
NZL      0.87    0.96    0.91    0.42
ZAF      0.87    0.91    0.89    0.87    9.37
NLD      0.90    0.97    0.95    0.92    0.88    5.14
USA      0.87    0.92    0.95    0.87    0.87    0.94    1.35
CHE      0.90    0.97    0.95    0.94    0.93    0.96    0.92   10.85


----------------------------------------------------------------------------------------
JER    ocs
----------------------------------------------------------------------------------------
          AUS     CAN     DFS     GBR     ITA     NZL     USA     NLD     CHE
AUS      0.78
CAN      0.55    5.30
DFS      0.52    0.64   12.73
GBR      0.63    0.77    0.82    2.65
ITA      0.50    0.74    0.72    0.80    0.78
NZL      0.62    0.56    0.46    0.55    0.53    0.31
USA      0.63    0.79    0.70    0.85    0.78    0.57    0.88
NLD      0.59    0.73    0.85    0.87    0.79    0.63    0.82    3.09
CHE      0.58    0.85    0.76    0.89    0.82    0.53    0.78    0.82    7.92


----------------------------------------------------------------------------------------
JER    ous
----------------------------------------------------------------------------------------
          AUS     CAN     DFS     GBR     NZL     USA     NLD     CHE
AUS      0.78
CAN      0.68    6.40
DFS      0.64    0.81   12.81
GBR      0.73    0.82    0.70    1.45
NZL      0.81    0.74    0.68    0.74    0.45
USA      0.67    0.89    0.76    0.83    0.71    1.04
NLD      0.67    0.88    0.89    0.76    0.78    0.85    4.36
CHE      0.75    0.88    0.80    0.86    0.78    0.86    0.92   10.71

----------------------------------------------------------------------------------------
JER    ofl
----------------------------------------------------------------------------------------
          AUS     CAN     DFS     GBR     ITA     USA     NLD     CHE
AUS      6.31
CAN      0.49    5.03
DFS      0.38    0.74   13.63
GBR      0.58    0.65    0.64    1.32
ITA      0.44    0.64    0.60    0.70    1.08
USA      0.66    0.73    0.62    0.68    0.76    1.62
NLD      0.43    0.68    0.64    0.73    0.67    0.66    4.64
CHE      0.51    0.83    0.71    0.70    0.68    0.74    0.70   10.74


----------------------------------------------------------------------------------------
RDC    sta
----------------------------------------------------------------------------------------
          AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS      0.66
CAN      0.88    6.26
DEU      0.89    0.97   13.08
DFS      0.87    0.96    0.97    8.63
GBR      0.92    0.96    0.96    0.93    1.31
NOR      0.87    0.93    0.94    0.98    0.92   13.56
NZL      0.88    0.89    0.86    0.89    0.92    0.92    0.49
USA      0.90    0.97    0.96    0.94    0.97    0.91    0.89    2.35
NLD      0.88    0.95    0.97    0.97    0.94    0.96    0.84    0.93    4.85
CAM      0.92    0.91    0.91    0.91    0.91    0.91    0.91    0.90    0.90    5.60
LVA      0.86    0.85    0.86    0.92    0.84    0.91    0.86    0.84    0.86    0.90    0.63


----------------------------------------------------------------------------------------
```

```
RDC     cwi
-------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NZL     USA     NLD     CAM     NOR     LVA
AUS     0.40
CAN     0.73    7.12
DEU     0.71    0.88    11.37
DFS     0.77    0.82    0.89    13.72
GBR     0.82    0.88    0.89    0.87    1.60
NZL     0.80    0.69    0.71    0.68    0.81    0.35
USA     0.67    0.84    0.81    0.83    0.83    0.70    1.28
NLD     0.72    0.92    0.92    0.89    0.91    0.69    0.81    4.51
CAM     0.78    0.79    0.79    0.79    0.79    0.82    0.79    0.80    6.70
NOR     0.81    0.80    0.81    0.87    0.82    0.80    0.82    0.87    0.80    14.17
LVA     0.68    0.74    0.69    0.67    0.67    0.70    0.67    0.74    0.79    0.80    0.30


-------------------------------------------------------------------------------
RDC     bde
-------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS     0.49
CAN     0.80    5.97
DEU     0.77    0.87    9.83
DFS     0.78    0.83    0.92    11.86
GBR     0.78    0.86    0.92    0.89    1.57
NOR     0.79    0.81    0.81    0.89    0.83    14.83
NZL     0.77    0.70    0.72    0.74    0.75    0.81    0.35
USA     0.71    0.76    0.89    0.83    0.89    0.83    0.73    1.29
NLD     0.70    0.83    0.90    0.85    0.91    0.84    0.69    0.90    4.24
CAM     0.83    0.82    0.84    0.83    0.83    0.83    0.85    0.83    0.83    4.88
LVA     0.74    0.77    0.80    0.80    0.78    0.84    0.75    0.69    0.73    0.83    0.35


-------------------------------------------------------------------------------
RDC     ang
-------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     USA     NLD     CAM     NOR     LVA
AUS     0.47
CAN     0.65    6.83
DEU     0.64    0.81    12.72
DFS     0.70    0.76    0.82    9.09
GBR     0.76    0.81    0.78    0.83    1.38
USA     0.69    0.86    0.85    0.82    0.85    1.21
NLD     0.73    0.82    0.62    0.75    0.83    0.74    5.09
CAM     0.81    0.77    0.78    0.79    0.78    0.79    0.79    7.07
NOR     0.74    0.76    0.79    0.63    0.77    0.79    0.71    0.77    16.06
LVA     0.66    0.64    0.63    0.62    0.63    0.62    0.64    0.77    0.77    0.29

-------------------------------------------------------------------------------
RDC     ran
-------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS     0.42
CAN     0.90    6.01
DEU     0.91    0.97    8.86
DFS     0.91    0.94    0.95    10.02
GBR     0.93    0.97    0.97    0.95    1.56
NOR     0.90    0.94    0.90    0.90    0.94    12.12
NZL     0.92    0.91    0.89    0.88    0.92    0.93    0.28
USA     0.90    0.98    0.96    0.94    0.97    0.94    0.91    1.67
NLD     0.91    0.96    0.98    0.96    0.97    0.95    0.88    0.96    5.76
CAM     0.93    0.93    0.93    0.93    0.93    0.93    0.93    0.93    0.93    5.55
LVA     0.89    0.93    0.92    0.91    0.91    0.89    0.89    0.91    0.92    0.92    0.42

-------------------------------------------------------------------------------
RDC     rwi
-------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NZL     USA     NLD     CAM     NOR     LVA
AUS     0.46
CAN     0.85    5.96
DEU     0.82    0.95    9.75
```

```
DFS      0.80    0.93    0.93   10.48
GBR      0.84    0.92    0.90    0.89    1.41
NZL      0.83    0.89    0.82    0.88    0.90    0.33
USA      0.78    0.91    0.85    0.89    0.94    0.87    1.43
NLD      0.84    0.94    0.96    0.93    0.89    0.83    0.81    6.21
CAM      0.86    0.88    0.87    0.88    0.87    0.89    0.87    0.88    6.69
NOR      0.85    0.88    0.86    0.94    0.87    0.88    0.88    0.89    0.88   13.82
LVA      0.79    0.82    0.82    0.86    0.78    0.81    0.77    0.82    0.86    0.87    0.41
```

```
--------------------------------------------------------------------------------
RDC    rls
--------------------------------------------------------------------------------
            AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS      0.23
CAN      0.70    6.50
DEU      0.73    0.94    9.31
DFS      0.70    0.97    0.94    9.28
GBR      0.79    0.77    0.85    0.78    1.59
NOR      0.74    0.87    0.86    0.94    0.80   11.85
NZL      0.69    0.67    0.68    0.67    0.71    0.74    0.12
USA      0.70    0.92    0.93    0.93    0.82    0.83    0.67    0.90
NLD      0.73    0.92    0.93    0.89    0.86    0.80    0.66    0.90    5.08
CAM      0.81    0.80    0.80    0.80    0.80    0.80    0.80    0.80    0.80    6.72
LVA      0.70    0.78    0.83    0.76    0.75    0.72    0.72    0.77    0.82    0.80    0.28
```

```
--------------------------------------------------------------------------------
RDC    rlr
--------------------------------------------------------------------------------
            AUS     CAN     DEU     DFS     NOR     NLD     USA     CAM     LVA
AUS      0.19
CAN      0.58    6.62
DEU      0.61    0.87   10.19
DFS      0.56    0.82    0.90   10.91
NOR      0.59    0.75    0.80    0.83   13.24
NLD      0.58    0.87    0.90    0.88    0.81    4.64
USA      0.55    0.72    0.77    0.67    0.71    0.80    0.90
CAM      0.76    0.72    0.73    0.71    0.71    0.71    0.71    6.82
LVA      0.59    0.73    0.77    0.82    0.66    0.70    0.71    0.73    0.24
```

```
--------------------------------------------------------------------------------
RDC    fan
--------------------------------------------------------------------------------
            AUS     CAN     DEU     DFS     GBR     NOR     USA     NLD     CAM     LVA
AUS      0.29
CAN      0.65    6.31
DEU      0.70    0.81   13.96
DFS      0.63    0.70    0.80    9.35
GBR      0.74    0.79    0.91    0.73    1.61
NOR      0.69    0.73    0.84    0.62    0.77   12.89
USA      0.68    0.85    0.83    0.72    0.83    0.77    1.07
NLD      0.68    0.75    0.89    0.78    0.88    0.66    0.80    4.86
CAM      0.80    0.79    0.77    0.77    0.77    0.77    0.79    0.79    8.03
LVA      0.67    0.65    0.68    0.63    0.69    0.74    0.69    0.68    0.79    0.27
```

```
--------------------------------------------------------------------------------
RDC    fua
--------------------------------------------------------------------------------
            AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS      0.39
CAN      0.77    5.64
DEU      0.74    0.90   12.54
DFS      0.72    0.80    0.84   11.72
GBR      0.77    0.88    0.95    0.87    1.54
NOR      0.70    0.82    0.76    0.85    0.80   11.99
NZL      0.77    0.81    0.81    0.69    0.78    0.72    0.36
USA      0.75    0.93    0.90    0.85    0.92    0.80    0.84    1.51
NLD      0.76    0.92    0.93    0.88    0.93    0.88    0.84    0.88    4.07
CAM      0.82    0.81    0.79    0.80    0.79    0.80    0.79    0.81    0.81    6.56
LVA      0.68    0.75    0.77    0.80    0.74    0.74    0.73    0.69    0.77    0.78    0.36
```

```
--------------------------------------------------------------------------------
RDC    ruh
--------------------------------------------------------------------------------
         AUS    CAN    DEU    DFS    GBR    NOR    NZL    USA    NLD    CAM    LVA
AUS    0.47
CAN    0.78   5.73
DEU    0.80   0.87  14.88
DFS    0.77   0.87   0.90  10.75
GBR    0.79   0.75   0.85   0.85   1.45
NOR    0.76   0.84   0.88   0.88   0.82  12.22
NZL    0.83   0.75   0.82   0.77   0.92   0.77   0.33
USA    0.77   0.84   0.90   0.92   0.89   0.84   0.85   1.37
NLD    0.75   0.75   0.91   0.91   0.88   0.91   0.83   0.86   4.20
CAM    0.85   0.83   0.82   0.83   0.84   0.82   0.85   0.83   0.82   5.95
LVA    0.73   0.73   0.76   0.84   0.73   0.75   0.75   0.73   0.76   0.82   0.39


--------------------------------------------------------------------------------
RDC    usu
--------------------------------------------------------------------------------
         AUS    CAN    DEU    DFS    GBR    NOR    NZL    USA    NLD    CAM    LVA
AUS    0.34
CAN    0.75   5.70
DEU    0.72   0.89  12.62
DFS    0.67   0.76   0.78  13.04
GBR    0.80   0.80   0.75   0.79   1.86
NOR    0.67   0.71   0.67   0.73   0.76  12.01
NZL    0.68   0.71   0.62   0.60   0.68   0.69   0.32
USA    0.78   0.82   0.75   0.85   0.89   0.78   0.70   1.21
NLD    0.78   0.83   0.80   0.90   0.91   0.81   0.58   0.90   4.54
CAM    0.80   0.78   0.76   0.76   0.78   0.76   0.79   0.78   0.77   5.93
LVA    0.63   0.65   0.62   0.60   0.75   0.70   0.68   0.70   0.68   0.76   0.32


--------------------------------------------------------------------------------
RDC    ude
--------------------------------------------------------------------------------
         AUS    CAN    DEU    DFS    GBR    NOR    USA    NLD    CAM    LVA
AUS    0.53
CAN    0.89   5.69
DEU    0.90   0.97  12.60
DFS    0.89   0.96   0.94  10.64
GBR    0.90   0.96   0.96   0.93   1.84
NOR    0.90   0.91   0.90   0.88   0.92  14.14
USA    0.88   0.96   0.96   0.95   0.96   0.92   1.31
NLD    0.90   0.97   0.97   0.95   0.97   0.91   0.96   4.19
CAM    0.93   0.93   0.93   0.93   0.93   0.92   0.93   0.93   4.49
LVA    0.89   0.89   0.88   0.91   0.88   0.89   0.88   0.88   0.92   0.42

--------------------------------------------------------------------------------
RDC    ftp
--------------------------------------------------------------------------------
         AUS    CAN    DEU    DFS    GBR    NOR    NZL    USA    NLD    CAM    LVA
AUS    0.54
CAN    0.92   5.70
DEU    0.93   0.97  13.06
DFS    0.89   0.94   0.92  11.91
GBR    0.91   0.93   0.95   0.89   1.49
NOR    0.89   0.91   0.89   0.94   0.91  14.22
NZL    0.92   0.90   0.90   0.87   0.89   0.89   0.26
USA    0.87   0.92   0.91   0.92   0.93   0.92   0.87   1.44
NLD    0.93   0.98   0.97   0.95   0.94   0.88   0.90   0.90   4.66
CAM    0.91   0.91   0.91   0.91   0.91   0.91   0.91   0.91   0.91   6.88
LVA    0.88   0.87   0.87   0.87   0.87   0.88   0.88   0.86   0.87   0.91   0.39

--------------------------------------------------------------------------------
RDC    ftl
--------------------------------------------------------------------------------
         AUS    CAN    DEU    DFS    GBR    NOR    USA    NLD    CAM    LVA    NZL
AUS    0.54
```

```
CAN     0.93    4.95
DEU     0.93    0.94   13.76
DFS     0.92    0.90    0.97   10.58
GBR     0.95    0.93    0.98    0.93    1.40
NOR     0.92    0.92    0.93    0.93    0.94   12.51
USA     0.94    0.93    0.96    0.92    0.97    0.94    1.64
NLD     0.93    0.93    0.98    0.97    0.97    0.95    0.95    5.20
CAM     0.94    0.94    0.94    0.93    0.94    0.94    0.94    0.94    7.47
LVA     0.90    0.91    0.90    0.90    0.90    0.94    0.89    0.90    0.93    0.48
NZL     0.94    0.93    0.92    0.92    0.93    0.93    0.92    0.92    0.94    0.92    0.37
```

---

```
RDC    rtp
--------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     NOR     NZL     NLD     USA     CAM     LVA
AUS     0.39
CAN     0.89    6.04
DEU     0.89    0.96   14.30
DFS     0.88    0.93    0.96   12.28
NOR     0.89    0.90    0.89    0.87   13.10
NZL     0.92    0.95    0.93    0.88    0.89    0.34
NLD     0.90    0.98    0.97    0.96    0.89    0.94    5.35
USA     0.88    0.91    0.95    0.92    0.92    0.89    0.96    1.44
CAM     0.91    0.91    0.91    0.91    0.91    0.91    0.91    0.91    6.35
LVA     0.91    0.91    0.89    0.90    0.88    0.91    0.93    0.88    0.91    0.37
```

---

```
RDC    ocs
--------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS     1.13
CAN     0.63    4.79
DEU     0.59    0.76   20.66
DFS     0.65    0.62    0.79   10.49
GBR     0.66    0.75    0.91    0.76    1.64
NOR     0.56    0.69    0.69    0.77    0.76   16.28
NZL     0.72    0.57    0.60    0.48    0.66    0.58    0.27
USA     0.63    0.78    0.88    0.74    0.88    0.75    0.69    0.57
NLD     0.61    0.72    0.88    0.82    0.88    0.71    0.63    0.85    3.02
CAM     0.72    0.77    0.76    0.77    0.77    0.75    0.72    0.79    0.79    6.23
```

---

```
RDC    ous
--------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS     1.46
CAN     0.71    5.40
DEU     0.75    0.88   17.40
DFS     0.66    0.79    0.82   10.79
GBR     0.83    0.80    0.83    0.73    1.61
NOR     0.71    0.80    0.80    0.78    0.82   13.66
NZL     0.83    0.81    0.79    0.75    0.81    0.75    0.36
USA     0.74    0.88    0.86    0.86    0.87    0.83    0.87    1.00
NLD     0.68    0.88    0.91    0.88    0.76    0.80    0.80    0.84    3.97
CAM     0.82    0.84    0.84    0.83    0.84    0.82    0.84    0.85    0.85    6.34
```

---

```
RDC    ofl
--------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     USA     NLD     CAM
AUS     0.63
CAN     0.39    4.40
DEU     0.41    0.76   16.20
DFS     0.38    0.80    0.80   13.58
GBR     0.50    0.69    0.73    0.67    1.42
NOR     0.49    0.70    0.67    0.58    0.75   12.94
USA     0.54    0.64    0.74    0.64    0.69    0.75    1.33
NLD     0.43    0.68    0.75    0.64    0.74    0.64    0.67    6.50
CAM     0.72    0.75    0.75    0.75    0.75    0.75    0.77    0.75    7.02
```

```
--------------------------------------------------------------------------------------------------------------------
^LAPPENDIX II. Number of common bulls
--------------------------------------------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
 -------------------------------------------------------------------------------
  CAN    0   130   76  133   40  152  117   31   19
  CHE   114    0  159  479   65  270  526   66   17
  FRA    66  119    0  178   56   91  179   48   14
  ITA   115  418  140    0   88  212  578   86   18
  NLD    32   62   45   70    0   56   81   33   12
  USA   143  239   62  154   42    0  227   33   19
  DEA    99  432  132  494   71  182    0   84   14
  SVN    28   64   46   83   32   28   79    0    9
  GBR    16   15   13   16   10   17   12    7    0
 -------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
 -------------------------------------------------------------------------------
  CAN    0   122   45  133   33  152  115   30   19
  CHE   107    0   96  424   60  241  463   63   17
  FRA    39   68    0  105   38   55  117   39   10
  ITA   115  364   81    0   80  212  542   84   18
  NLD    28   59   33   66    0   42   75   33   12
  USA   143  206   36  154   33    0  209   32   19
  DEA    98  373   83  457   69  157    0   82   13
  SVN    27   61   38   81   32   27   78    0    9
  GBR    16   15    9   16   10   17   12    7    0
 -------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  DEA  SVN  GBR  USA
 -------------------------------------------------------------------------------
  CAN    0   130   76  133   33  117   24   19  152
  CHE   114    0  159  479   64  526   52   17  270
  FRA    66  119    0  178   52  179   36   14   91
  ITA   115  418  140    0   80  578   68   18  212
  NLD    28   62   42   66    0   76   26   12   42
  DEA    99  432  132  494   70    0   64   14  227
  SVN    22   49   36   64   26   60    0    7   24
  GBR    16   15   13   16   10   12    5    0   19
  USA   143  239   62  154   33  182   21   17    0
 -------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  NLD  USA  GBR
 -------------------------------------------------------------------------------
  CAN    0   129   76   21  151   19
  CHE   114    0  155   41  268   17
  FRA    66  115    0   34   91   14
  NLD    18   42   29    0   27    9
  USA   142  239   62   22    0   19
  GBR    16   15   13    7   17    0
 -------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
```

```
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
---------------------------------------------------------------------------------
 CAN     0  130   76  133   40  152  117   31   19
 CHE   114    0  159  479   65  270  526   66   17
 FRA    66  119    0  178   56   91  179   48   14
 ITA   115  418  140    0   88  212  578   86   18
 NLD    32   62   45   70    0   56   81   33   12
 USA   143  239   62  154   42    0  227   33   19
 DEA    99  432  132  494   71  182    0   84   14
 SVN    28   64   46   83   32   28   79    0    9
 GBR    16   15   13   16   10   17   12    7    0
---------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  NLD  USA  DEA  GBR  SVN  ITA
---------------------------------------------------------------------------------
 CAN     0  130   45   40  152  117   19   24  129
 CHE   114    0   96   65  270  526   17   52  472
 FRA    39   68    0   38   55  117   10   36  105
 NLD    32   62   33    0   56   81   12   26   86
 USA   143  239   36   42    0  227   19   24  198
 DEA    99  432   83   71  182    0   14   64  572
 GBR    16   15    9   10   17   12    0    7   18
 SVN    22   49   36   26   21   60    5    0   68
 ITA   112  412   81   69  140  486   16   64    0
---------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
---------------------------------------------------------------------------------
 CAN     0  130   76  133   40  152  117   31   19
 CHE   114    0  159  479   65  270  526   66   17
 FRA    66  119    0  178   56   91  179   48   14
 ITA   115  418  140    0   88  212  578   86   18
 NLD    32   62   45   70    0   56   81   33   12
 USA   143  239   62  154   42    0  227   33   19
 DEA    99  432  132  494   71  182    0   84   14
 SVN    28   64   46   83   32   28   79    0    9
 GBR    16   15   13   16   10   17   12    7    0
---------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
---------------------------------------------------------------------------------
 CAN     0  130   76  133   32  152  117   31   19
 CHE   114    0  159  479   63  270  526   66   17
 FRA    66  119    0  178   52   91  179   48   14
 ITA   115  418  140    0   79  212  578   86   18
 NLD    27   61   42   65    0   41   75   33   12
 USA   143  239   62  154   31    0  227   33   19
 DEA    99  432  132  494   69  182    0   84   14
 SVN    28   64   46   83   32   28   79    0    9
 GBR    16   15   13   16   10   17   12    7    0
---------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  DEA  SVN  USA
---------------------------------------------------------------------------------
 CAN     0  130   76  129   32  117   31  152
 CHE   114    0  159  473   63  526   66  270
 FRA    66  119    0  177   52  179   48   91
```

```
 ITA  112  413  140    0   78  572   86  198
 NLD   27   61   42   64    0   75   33   41
 DEA   99  432  132  486   69    0   84  227
 SVN   28   64   46   83   32   79    0   33
 USA  143  239   62  140   31  182   28    0
------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
------------------------------------------------------------------------

 CAN    0  130   45   90   32  152   84   24   19
 CHE  114    0   96  308   64  269  332   52   17
 FRA   39   68    0   97   37   55  107   36   10
 ITA   80  257   74    0   59  114  295   61   15
 NLD   27   62   32   54    0   41   63   26   12
 USA  143  239   36   81   32    0  130   25   19
 DEA   73  266   76  260   58   93    0   63   11
 SVN   22   49   36   58   26   22   60    0    7
 GBR   16   15    9   13   10   17   10    5    0
------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
------------------------------------------------------------------------

 CAN    0  130   76  133   33  152  117   31   19
 CHE  114    0  159  479   64  270  526   66   17
 FRA   66  119    0  178   52   91  179   48   14
 ITA  115  418  140    0   80  212  578   86   18
 NLD   28   62   42   66    0   42   76   33   12
 USA  143  239   62  154   33    0  227   33   19
 DEA   99  432  132  494   70  182    0   84   14
 SVN   28   64   46   83   32   28   79    0    9
 GBR   16   15   13   16   10   17   12    7    0
------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN
------------------------------------------------------------------------

 CAN    0  130   76  133   33  152  117   31
 CHE  114    0  159  479   64  270  526   66
 FRA   66  119    0  178   52   91  179   48
 ITA  115  418  140    0   80  212  578   86
 NLD   28   62   42   66    0   42   76   33
 USA  143  239   62  154   33    0  227   33
 DEA   99  432  132  494   70  182    0   84
 SVN   28   64   46   83   32   28   79    0
------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
------------------------------------------------------------------------

 CAN    0  130   76  133   40  152  117   24   19
 CHE  114    0  159  479   65  270  526   52   17
 FRA   66  119    0  178   56   91  179   36   14
 ITA  115  418  140    0   88  212  578   68   18
 NLD   32   62   45   70    0   56   81   26   12
 USA  143  239   62  154   42    0  227   25   19
 DEA   99  432  132  494   71  182    0   65   14
 SVN   22   49   36   64   26   22   62    0    7
 GBR   16   15   13   16   10   17   12    5    0
------------------------------------------------------------------------
```

```
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
 ---------------------------------------------------------------------------------
   CAN    0  130   76  133   40  150  117   31   19
   CHE  114    0  159  479   65  270  526   66   17
   FRA   66  119    0  178   56   91  179   48   14
   ITA  115  418  140    0   88  212  578   86   18
   NLD   32   62   45   70    0   56   81   33   12
   USA  142  239   62  154   42    0  227   33   19
   DEA   99  432  132  494   71  182    0   84   14
   SVN   28   64   46   83   32   28   79    0    9
   GBR   16   15   13   16   10   17   12    7    0
 ---------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  NLD  USA  DEA  SVN  GBR  ITA
 ---------------------------------------------------------------------------------
   CAN    0  130   76   40  152  106   30   19  121
   CHE  114    0  159   65  270  494   64   17  437
   FRA   66  119    0   56   91  169   47   14  165
   NLD   32   62   45    0   56   75   33   12   78
   USA  143  239   62   42    0  202   32   19  168
   DEA   91  401  124   69  154    0   82   13  484
   SVN   27   62   45   32   27   78    0    9   83
   GBR   16   15   13   10   17   12    7    0   18
   ITA  105  381  128   65  121  421   80   16    0
 ---------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
 ---------------------------------------------------------------------------------
   CAN    0  130   76  133   40  152  117   30   19
   CHE  114    0  159  479   65  270  526   65   17
   FRA   66  119    0  178   56   91  179   47   14
   ITA  115  418  140    0   88  210  578   85   18
   NLD   32   62   45   70    0   56   81   33   12
   USA  143  239   62  153   42    0  227   32   19
   DEA   99  432  132  494   71  182    0   83   14
   SVN   27   63   45   82   32   27   78    0    9
   GBR   16   15   13   16   10   17   12    7    0
 ---------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  DEA  SVN  USA
 ---------------------------------------------------------------------------------
   CAN    0  130   76   90   28   84   30  152
   CHE  114    0  156  308   60  332   64  269
   FRA   66  116    0  117   49  127   47   91
   ITA   80  257   88    0   58  295   71  114
   NLD   24   60   40   54    0   62   32   36
   DEA   73  266   87  260   58    0   75  130
   SVN   27   62   45   69   32   69    0   31
   USA  143  239   62   81   28   93   27    0
 ---------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
 ---------------------------------------------------------------------------------
```

```
 CAN     0   122    66   133    40   152    84    24    19
 CHE   107     0   121   423    60   241   327    52    17
 FRA    60    91     0   144    46    76   116    36    14
 ITA   115   362   116     0    86   209   331    68    18
 NLD    32    59    40    70     0    56    63    26    12
 USA   143   206    55   154    42     0   130    24    19
 DEA    73   262    84   295    58    93     0    63    11
 SVN    22    49    36    64    26    21    60     0     7
 GBR    16    15    13    16    10    17    10     5     0
-------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
-------------------------------------------------------------------------------
 CAN     0   122    66   133    40   150   117    24    19
 CHE   107     0   121   424    60   240   471    52    17
 FRA    60    91     0   144    46    76   148    36    14
 ITA   115   364   116     0    88   212   571    68    18
 NLD    32    59    40    70     0    56    81    26    12
 USA   141   205    55   154    42     0   225    25    19
 DEA    98   383   110   490    71   178     0    65    14
 SVN    22    49    36    64    26    22    62     0     7
 GBR    16    15    13    16    10    17    12     5     0
-------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
-------------------------------------------------------------------------------
 CAN     0   122    66   129    40   151   117    24    19
 CHE   107     0   121   423    60   240   471    52    17
 FRA    60    91     0   143    46    76   148    36    14
 ITA   112   363   116     0    86   198   566    68    18
 NLD    32    59    40    69     0    56    81    26    12
 USA   142   205    55   140    42     0   225    24    19
 DEA    98   383   110   483    71   178     0    65    14
 SVN    22    49    36    64    26    21    62     0     7
 GBR    16    15    13    16    10    17    12     5     0
-------------------------------------------------------------------------------
BSW
--------
BSW
--------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  DEA  ITA  SVN  USA  FRA
-------------------------------------------------------------------------------
 CAN     0   121   116    91    24   153    46
 CHE   106     0   465   308    52   240    96
 DEA    99   380     0   336    65   221   117
 ITA    81   256   285     0    61   114    97
 SVN    22    49    62    58     0    25    36
 USA   143   206   177    81    22     0    55
 FRA    40    68    83    74    36    36     0
-------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  DEA  ITA  SVN  FRA
-------------------------------------------------------------------------------
 CAN     0   128   118   134    31    77
 CHE   113     0   526   479    65   159
 DEA    99   432     0   576    84   179
```

```
  ITA  116  418  493    0   85  178
  SVN   28   64   79   83    0   48
  FRA   67  119  132  140   46    0
 ------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  DEA  ITA  SVN  USA  FRA
 ------------------------------------------------------------------------------
  CAN    0  121   94   91   24  153   46
  CHE  106    0  362  308   52  240   96
  DEA   83  293    0  302   64  158  109
  ITA   81  256  267    0   61  114   97
  SVN   22   49   61   58    0   25   36
  USA  143  206  117   81   22    0   55
  FRA   40   68   78   74   36   36    0
 ------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  USA  FRA
 ------------------------------------------------------------------------------
  CHE    0  508  308   52  269  157
  DEA  417    0  335   64  212  175
  ITA  257  284    0   61  114  117
  SVN   49   60   58    0   24   36
  USA  239  166   81   21    0   90
  FRA  118  130   88   36   62    0
 ------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  DEA  ITA  SVN  USA  FRA
 ------------------------------------------------------------------------------
  CAN    0   78   68   72   22   85   34
  CHE   67    0  362  308   49  240   96
  DEA   57  293    0  302   60  158  109
  ITA   64  256  267    0   55  114   97
  SVN   20   47   57   53    0   23   35
  USA   76  206  117   81   20    0   55
  FRA   28   68   78   74   35   36    0
 ------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  DEA  ITA  SVN  FRA
 ------------------------------------------------------------------------------
  CAN    0  128  118  130   30   77
  CHE  113    0  526  473   63  159
  DEA   99  432    0  570   83  179
  ITA  113  413  485    0   83  177
  SVN   27   62   78   81    0   47
  FRA   67  119  132  140   45    0
 ------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  FRA
 ------------------------------------------------------------------------------
  CHE    0  525  476   51  156
  DEA  431    0  576   65  178
  ITA  415  493    0   67  176
  SVN   49   62   64    0   36
  FRA  118  131  140   36    0
```

```
--------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  FRA
--------------------------------------------------------------------------------
  CHE    0  298  283   50  109
  DEA  251    0  293   63  126
  ITA  241  260    0   61  116
  SVN   48   60   58    0   36
  FRA   81   86   88   36    0
--------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  FRA
--------------------------------------------------------------------------------
  CHE    0  525  470   64  156
  DEA  431    0  570   83  178
  ITA  410  485    0   84  175
  SVN   63   78   82    0   47
  FRA  118  131  140   45    0
--------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  FRA
--------------------------------------------------------------------------------
  CHE    0  331  306   64   92
  DEA  265    0  294   75  105
  ITA  255  260    0   71   96
  SVN   63   69   69    0   39
  FRA   67   75   73   38    0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
--------------------------------------------------------------------------------
  CAN    0   22   62   19
  GBR   19    0   76   11
  USA   52   75    0   22
  AUS   19    9   19    0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
--------------------------------------------------------------------------------
  CAN    0   22   62   19
  GBR   19    0   76   11
  USA   52   75    0   22
  AUS   19    9   19    0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
--------------------------------------------------------------------------------
  CAN    0   22   62   19
  GBR   19    0   76   11
  USA   52   75    0   22
  AUS   19    9   19    0
```

```
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   35   19
 USA   33    0    6
 AUS   19    4    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
```

```
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   60   18
 GBR   19    0   76   11
 USA   51   75    0   22
 AUS   18    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ----------------------------------------------------------------------
 CAN    0   22   62   19
 GBR   19    0   76   11
 USA   52   75    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  AUS  USA
 ----------------------------------------------------------------------
```

```
  CAN   0   19   62
  AUS  19    0   22
  USA  52   19    0
  ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ---------------------------------------------------------------------------
  CAN   0   12   62   19
  GBR   9    0   33    9
  USA  52   31    0   21
  AUS  19    8   18    0
 ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ---------------------------------------------------------------------------
  CAN   0   20   60   18
  GBR  17    0   74   10
  USA  51   73    0   22
  AUS  18    8   19    0
 ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
 ---------------------------------------------------------------------------
  CAN   0   20   62   19
  GBR  17    0   74   10
  USA  52   73    0   22
  AUS  19    8   19    0
 ---------------------------------------------------------------------------
GUE
--------
GUE
--------
HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
 ---------------------------------------------------------------------------
  AUS    0  488  876  451  781  758  620  804  882  660  887 1064  466  560  493  306  555  533   90  417  316  128  480  235
  BEL  418    0  648  514  823  660  585  765  729  668 1021  759  413  571  280  247  421  527   93  400  262  158  499  234
  CAN  794  613    0  808 1779 1142 1278 1303 1551 1719 1315 3121  898 1123  369  375 1146 1068  155  441  667  201  858  470
  CHE  400  514  702    0  860  569  549  580  693  701  808  881  370  528  243  218  375  479   77  350  263  126  428  233
  DEU  432  697  742  633    0 1916 1310 1970 1637 2099 2250 2511  965 1566  412  356 1109 1500  212  538  510  301  885  637
  DFS  497  577  830  513  942    0  943 1419 1331 1258 1618 1645  729 1126  457  383  795 1061  163  537  439  218  765  414
  ESP  474  565  802  449  621  669    0 1100 1065 1248 1069 1502  709  903  320  367  839  859  131  412  480  183  734  378
  FRA  491  698  751  496  718  630  726    0 1405 1388 1761 2241  801 1353  483  356 1075 1131  145  528  479  180  746  385
  GBR  735  723 1567  689  869  917  863  791    0 1490 1634 2068  791 1121  478  394  879 1022  154  729  498  212  825  433
  ITA  540  661 1475  645 1125  983  917  730 1266    0 1503 2345  896 1316  323  340  966 1190  186  469  583  257  874  529
  NLD  728 1118 1161  790 1328 1182  909  914 1362 1268    0 2163  802 1316  606  382  892 1352  193  663  463  245  872  463
  USA  880  646 3119  808  976 1013  978 1027 1885 1870 1715    0 1164 1571  539  466 1675 1535  203  569  826  229 1093  652
  HUN  330  335  793  310  579  521  548  474  638  759  606 1053    0  741  275  299  599  835  116  334  422  145  569  322
  POL  358  448  833  378  858  727  573  730  842 1003  999 1300  568    0  313  291  741 1083  183  402  488  231  763  481
  NZL  395  216  316  203  258  293  260  236  374  265  539  453  205  192    0  205  314  332   47  334  179   66  283  132
  ZAF  280  210  348  191  255  301  339  252  366  300  344  494  257  216  187    0  307  301   52  237  230   75  314  136
  JPN  283  229  393  217  270  303  305  263  344  354  328  453  242  241  147  194    0  729  109  328  490  137  538  305
  CZE  339  389  728  348  897  612  585  647  722  880 1142 1144  706  741  216  224  220    0  144  399  471  213  696  411
  EST   44   54   73   35  102   86   56   52   75   96  118  129   67   98   21   22   27   78    0   68   76   57  104  109
  IRL  375  383  416  349  386  431  395  415  782  442  607  527  279  296  274  225  188  300   36    0  201  103  366  174
  KOR  221  181  611  187  255  292  336  243  372  490  312  936  330  351  120  177  226  326   31  139    0  101  417  249
  SVN   86  123  147   90  269  171  130  117  159  221  208  176  104  180   47   53   65  155   32   78   61    0  146  116
```

```
  PRT  365  501  862  386  613  653  703  591  760  840  865 1114  545  702  219  300  258  571   65  318  351  114    0  363
  LVA  105  131  275  116  448  234  189  152  243  357  289  546  221  325   68   81   89  257   58  100  145   64  285    0
     ----------------------------------------------------------------------------------------------------------------------

HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
     ----------------------------------------------------------------------------------------------------------------------
  AUS    0  481  876  451  781  757  631  662  882  660  832 1064  466  558  493  256  553  533   89  417  315  128  485  213
  BEL  417    0  642  511  818  653  597  688  721  664  966  742  410  567  276  216  410  525   93  397  261  158  501  215
  CAN  794  613    0  808 1778 1142 1286 1127 1551 1719 1241 3121  898 1122  369  322 1142 1068  155  441  663  201  863  444
  CHE  400  513  702    0  860  569  557  543  693  701  789  881  370  527  243  197  373  479   77  350  262  126  431  214
  DEU  432  697  742  633    0 1916 1336 1834 1636 2099 2210 2511  965 1560  412  321 1106 1500  211  538  506  301  888  609
  DFS  497  576  830  513  942    0  965 1233 1329 1258 1539 1644  728 1121  456  329  793 1061  162  535  436  218  771  388
  ESP  483  590  810  459  654  691    0 1022 1086 1262 1059 1520  718  922  331  322  842  878  135  427  482  188  754  364
  FRA  445  651  692  466  645  597  720    0 1244 1347 1410 1794  747 1261  392  270  906 1074  141  468  440  179  709  357
  GBR  735  723 1567  689  869  917  892  737    0 1490 1567 2066  791 1119  478  338  876 1022  154  726  495  212  829  405
  ITA  540  661 1475  645 1125  983  936  717 1266    0 1488 2345  896 1316  323  330  963 1190  186  469  578  257  878  514
  NLD  696 1057 1104  766 1306 1158  910  782 1308 1256    0 1927  781 1292  580  319  819 1333  190  649  442  245  859  429
  USA  880  645 3119  808  976 1012  994  824 1885 1870 1471    0 1164 1569  539  397 1671 1535  203  567  820  229 1099  621
  HUN  330  335  793  310  579  521  557  457  638  759  589 1053    0  740  275  271  598  835  116  334  418  145  574  305
  POL  358  448  833  378  858  727  594  687  841 1003  988 1300  568    0  313  265  739 1083  182  402  485  231  768  460
  NZL  395  216  316  203  258  293  268  207  374  265  518  453  205  192    0  168  314  332   47  334  178   66  285  114
  ZAF  240  193  306  175  236  277  300  212  315  295  285  409  240  208  150    0  260  280   51  200  210   75  298  121
  JPN  277  223  386  212  265  298  302  250  336  349  317  444  239  238  145  178    0  728  109  328  485  137  542  287
  CZE  339  389  728  348  897  612  608  612  722  880 1125 1144  706  741  216  212  218    0  144  399  469  213  698  396
  EST   44   54   73   35  102   86   60   52   75   96  117  129   67   98   21   22   27   78    0   68   76   57  104  103
  IRL  375  383  416  349  386  431  414  384  780  442  593  527  279  296  274  194  186  300   36    0  199  103  368  160
  KOR  221  180  608  187  255  292  339  235  371  488  300  928  327  350  120  161  223  326   31  139    0  101  415  239
  SVN   86  123  147   90  269  171  137  117  159  221  206  176  104  180   47   53   65  155   32   78   61    0  147  111
  PRT  367  504  866  387  614  657  725  584  764  843  854 1117  551  708  220  290  255  573   65  320  349  115    0  346
  LVA   95  120  261  106  426  220  185  144  225  347  267  525  208  313   58   73   84  249   53   90  142   61  273    0
     ----------------------------------------------------------------------------------------------------------------------

HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
      AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  PRT  SVN  LVA
     ----------------------------------------------------------------------------------------------------------------------
  AUS    0  488  876  451  781  757  622  804  882  660  861 1064  466  560  493  306  555  533   90  417  315  484  101  235
  BEL  418    0  648  514  823  659  588  765  729  668  997  759  413  571  280  247  421  527   93  400  261  501  126  234
  CAN  794  613    0  808 1779 1142 1281 1303 1551 1719 1284 3121  898 1123  369  375 1145 1068  155  441  664  862  175  470
  CHE  400  514  702    0  860  569  550  581  693  701  802  881  370  528  243  218  375  479   77  350  262  430  101  233
  DEU  432  697  742  633    0 1916 1316 1971 1637 2099 2237 2511  965 1566  412  383  795 1500  212  538  507  887  266  637
  DFS  497  577  830  513  942    0  946 1418 1330 1258 1576 1644  728 1125  456  383  795 1061  163  536  436  771  185  414
  ESP  475  568  803  451  628  672    0 1103 1067 1251 1058 1505  710  906  322  367  839  862  133  413  478  740  154  380
  FRA  491  698  751  497  719  630  730    0 1405 1388 1646 2241  801 1353  483  356 1075 1131  145  528  477  753  155  385
  GBR  735  723 1567  689  869  917  866  791    0 1490 1605 2067  791 1121  478  394  879 1022  154  727  496  830  178  433
  ITA  540  661 1475  645 1125  983  921  730 1266    0 1499 2345  896 1316  323  340  966 1190  186  469  580  877  229  529
  NLD  724 1094 1154  789 1326 1181  911  892 1350 1267    0 2035  793 1307  593  372  858 1347  192  656  455  871  205  458
  USA  880  646 3119  808  976 1012  980 1027 1885 1870 1673    0 1164 1571  539  466 1674 1535  203  568  822 1098  197  652
  HUN  330  335  793  310  579  521  549  474  638  759  606 1053    0  741  275  299  599  835  116  334  420  574  127  322
  POL  358  448  833  378  858  727  575  730  842 1003  998 1300  568    0  313  291  741 1083  183  402  486  767  205  481
  NZL  395  216  316  203  258  293  261  236  374  265  537  453  205  192    0  205  314  332   47  334  178  284   55  132
  ZAF  280  210  348  191  255  301  340  252  366  300  342  494  257  216  187    0  307  301   52  237  229  314   56  136
  JPN  279  226  389  214  267  300  302  259  340  351  323  448  240  239  145  192    0  729  109  328  486  542  113  305
  CZE  339  389  728  348  897  612  587  647  722  880 1141 1144  706  741  216  224  218    0  144  399  470  699  184  411
  EST   44   54   73   35  102   86   57   52   75   96  118  129   67   98   21   22   27   78    0   68   76  104   53  109
  IRL  375  383  416  349  386  431  396  415  780  442  604  527  279  296  274  225  186  300   36    0  200  367   80  174
  KOR  221  180  609  187  255  292  336  243  372  489  308  930  329  351  120  176  224  326   31  139    0  416   88  249
  PRT  366  502  865  386  613  656  709  595  762  842  865 1116  550  707  219  300  256  573   65  319  350    0  120  363
  SVN   69   96  130   75  243  145  110  101  133  195  175  154   90  160   40   40   50  135   28   64   54   95    0  100
  LVA  105  131  275  116  448  234  191  152  243  357  288  546  221  325   68   81   88  257   58  100  144  285   58    0
     ----------------------------------------------------------------------------------------------------------------------

HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
```

```
        AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  ZAF  JPN  CZE  EST  IRL  KOR  PRT  SVN  LVA
     ----------------------------------------------------------------------------------------------------------------------
  AUS    0  474  876  435  779  757  635  662  879  660  470 1061  465  555  302  553  533   88  415  315  476   99  235
  BEL  415    0  634  486  807  644  594  684  708  662  618  727  404  560  235  405  522   92  390  256  490  124  234
  CAN  794  608    0  771 1777 1138 1290 1127 1549 1719  864 3121  898 1121  370 1142 1068  154  440  663  856  172  470
  CHE  396  489  672    0  776  554  536  679  682  544  361  506  214  371  456   74  346  260  414   97  228
  DEU  431  695  742  580    0 1904 1345 1833 1634 2099 1397 2507  962 1556  351 1105 1499  211  537  506  870  263  637
  DFS  497  574  830  503  941    0  968 1227 1318 1253  922 1634  724 1111  379  790 1059  161  534  436  755  182  413
  ESP  486  592  813  457  671  699    0 1030 1089 1268  714 1526  719  925  369  846  881  136  429  482  751  157  387
  FRA  445  651  692  461  645  597  734    0 1243 1347  824 1793  824 1259  300  906 1074  139  467  440  694  154  371
  GBR  735  714 1567  679  868  916  899  737    0 1490  933 2061  787 1110  388  875 1021  151  718  495  814  175  433
  ITA  540  661 1475  632 1124  982  944  717 1263    0 1114 2345  896 1313  335  963 1190  184  469  578  868  227  529
  NLD  443  671  868  516  994  853  634  597  889 1044    0 1072  499  947  206  449  927  152  372  306  554  194  353
  USA  879  637 3119  755  975 1011  997  824 1883 1869  960    0 1162 1567  460 1671 1534  202  564  819 1085  194  652
  HUN  330  333  793  305  579  521  561  457  637  759  395 1052    0  738  296  598  835  116  331  418  567  126  322
  POL  358  445  833  358  858  724  602  687  837 1002  818 1299  568    0  286  739 1080  182  399  485  757  203  481
  ZAF  277  207  345  187  252  298  339  218  363  296  184  489  255  213    0  303  296   49  234  226  308   53  134
  JPN  277  223  386  212  265  298  303  250  336  349  244  444  239  238  189    0  728  109  327  485  538  112  305
  CZE  339  389  728  336  897  612  612  612  722  880  894 1144  706  741  220  218    0  142  398  469  691  182  411
  EST   44   54   73   35  102   86   62   52   75   96  100  129   67   98   22   27   78    0   66   76  102   53  108
  IRL  375  381  416  345  385  431  418  384  773  442  373  527  279  295  223  186  300   36    0  199  360   79  174
  KOR  221  180  608  186  255  292  339  235  371  488  226  927  327  350  175  223  326   31  139    0  415   88  249
  PRT  366  499  865  376  612  652  725  583  760  840  566 1114  549  700  297  254  573   64  319  349    0  120  360
  SVN   68   96  129   74  241  144  114  101  132  194  174  153   90  160   37   50  135   28   64   54   95    0   99
  LVA  105  131  275  114  448  234  206  150  243  357  229  546  221  325   80   88  257   58  100  144  285   58    0
     ----------------------------------------------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
        AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
     ----------------------------------------------------------------------------------------------------------------------
  AUS    0  488  876  451  781  758  619  804  882  660  887 1064  466  560  493  306  555  533   90  417  316  129  484  235
  BEL  418    0  648  514  823  660  581  765  729  668 1021  759  413  571  280  247  421  527   93  400  262  159  501  234
  CAN  794  613    0  808 1779 1142 1275 1303 1551 1719 1315 3121  898 1123  369  375 1145 1068  155  441  667  202  861  470
  CHE  400  514  702    0  860  569  548  580  693  701  808  881  370  528  243  218  375  479   77  350  263  127  430  233
  DEU  432  697  742  633    0 1916 1303 1970 1637 2099 2250 2511  965 1566  412  356 1109 1500  212  538  510  302  886  637
  DFS  497  577  830  513  942    0  937 1419 1331 1258 1618 1645  729 1126  457  383  795 1061  163  537  439  219  770  414
  ESP  473  561  799  447  613  663    0 1095 1059 1242 1063 1496  708  900  318  367  835  857  131  411  479  184  736  377
  FRA  491  698  751  496  718  629  720    0 1405 1388 1761 2241  801 1353  483  356 1075 1131  145  528  479  181  752  385
  GBR  735  723 1567  689  869  917  856  791    0 1490 1634 2068  791 1121  478  394  879 1022  154  729  498  213  830  433
  ITA  540  661 1475  645 1125  983  910  730 1266    0 1503 2345  896 1316  323  340  966 1190  186  469  583  258  876  529
  NLD  728 1118 1161  790 1328 1182  902  914 1362 1268    0 2163  802 1316  606  382  892 1352  193  663  463  246  875  463
  USA  880  646 3119  808  976 1012  972 1027 1885 1870 1715    0 1164 1571  539  466 1674 1535  203  569  826  230 1097  652
  HUN  330  335  793  310  579  521  548  474  638  759  606 1053    0  741  275  299  599  835  116  334  422  146  573  322
  POL  358  448  833  378  858  727  569  730  842 1003  999 1300  568    0  313  291  741 1083  183  402  488  232  766  481
  NZL  395  216  316  203  258  293  258  236  374  265  539  453  205  192    0  205  314  332   47  334  179   66  284  132
  ZAF  280  210  348  191  255  301  339  252  366  300  344  494  257  216  187    0  307  301   52  237  230   76  314  136
  JPN  281  227  390  215  268  301  303  261  342  352  326  450  241  239  146  193    0  729  109  328  489  138  541  305
  CZE  339  389  728  348  897  612  583  647  722  880 1142 1144  706  741  216  224  220    0  144  399  471  214  699  411
  EST   44   54   73   35  102   86   56   52   75   96  118  129   67   98   21   22   27   78    0   68   76   57  104  109
  IRL  375  383  416  349  386  431  394  415  782  442  607  527  279  296  274  225  187  300   36    0  201  104  367  174
  KOR  221  181  611  187  255  292  334  243  372  490  312  936  330  351  120  177  224  326   31  139    0  102  417  249
  SVN   87  124  148   91  270  172  131  118  160  222  209  177  105  181   47   53   66  156   32   79   62    0  148  117
  PRT  366  502  865  386  613  656  703  595  762  841  867 1115  549  706  219  300  257  573   65  319  351  115    0  363
  LVA  105  131  275  116  448  234  187  152  243  357  289  546  221  325   68   81   88  257   58  100  145   64  285    0
     ----------------------------------------------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
        AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  PRT  SVN  LVA
     ----------------------------------------------------------------------------------------------------------------------
  AUS    0  463  876  451  781  758  619  804  882  660  885 1064  466  560  493  306  360  533   90  417  314  484  101  235
  BEL  415    0  628  507  803  639  565  718  698  662  932  712  398  559  265  235  311  513   93  385  252  493  126  233
  CAN  794  603    0  808 1779 1142 1277 1303 1551 1719 1312 3121  898 1123  369  375  843 1068  155  441  664  861  175  470
  CHE  400  510  702    0  860  569  548  581  693  701  808  881  370  528  243  218  312  479   77  350  261  430  101  233
  DEU  432  692  742  633    0 1916 1305 1971 1637 2099 2099 2248 2511  965 1566  412  356  884 1500  212  538  507  886  266  637
  DFS  497  572  830  513  942    0  940 1419 1331 1258 1610 1645  729 1126  457  383  567 1061  163  537  436  770  185  414
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|  | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | NZL | ZAF | JPN | CZE | EST | IRL | KOR | SVN | PRT | LVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESP | 473 | 556 | 802 | 447 | 616 | 666 | 0 | 1097 | 1062 | 1245 | 1062 | 1499 | 709 | 901 | 319 | 367 | 656 | 858 | 131 | 411 | 477 | 737 | 154 | 377 |
| FRA | 491 | 686 | 751 | 497 | 719 | 630 | 724 | 0 | 1405 | 1388 | 1750 | 2241 | 801 | 1353 | 483 | 356 | 738 | 1131 | 145 | 528 | 476 | 752 | 155 | 385 |
| GBR | 735 | 706 | 1567 | 689 | 869 | 917 | 860 | 791 | 0 | 1490 | 1631 | 2068 | 791 | 1121 | 478 | 394 | 638 | 1022 | 154 | 729 | 496 | 830 | 178 | 433 |
| ITA | 540 | 661 | 1475 | 645 | 1125 | 983 | 914 | 730 | 1266 | 0 | 1503 | 2345 | 896 | 1316 | 323 | 340 | 857 | 1190 | 186 | 469 | 580 | 876 | 229 | 529 |
| NLD | 728 | 1021 | 1161 | 790 | 1327 | 1182 | 904 | 915 | 1361 | 1268 | 0 | 2156 | 802 | 1315 | 605 | 382 | 646 | 1352 | 192 | 662 | 458 | 875 | 205 | 462 |
| USA | 880 | 631 | 3119 | 808 | 976 | 1012 | 976 | 1027 | 1885 | 1870 | 1712 | 0 | 1164 | 1571 | 539 | 466 | 1153 | 1535 | 203 | 569 | 821 | 1097 | 197 | 652 |
| HUN | 330 | 331 | 793 | 310 | 579 | 521 | 548 | 474 | 638 | 759 | 606 | 1053 | 0 | 741 | 275 | 299 | 481 | 835 | 116 | 334 | 420 | 573 | 127 | 322 |
| POL | 358 | 445 | 833 | 378 | 858 | 727 | 571 | 730 | 842 | 1003 | 999 | 1300 | 568 | 0 | 313 | 291 | 637 | 1083 | 183 | 402 | 486 | 766 | 205 | 481 |
| NZL | 395 | 210 | 316 | 203 | 258 | 293 | 260 | 236 | 374 | 265 | 539 | 453 | 205 | 192 | 0 | 205 | 201 | 332 | 47 | 334 | 177 | 284 | 55 | 132 |
| ZAF | 279 | 207 | 347 | 190 | 254 | 300 | 338 | 251 | 365 | 299 | 343 | 493 | 256 | 215 | 187 | 0 | 209 | 301 | 52 | 237 | 228 | 314 | 56 | 136 |
| JPN | 241 | 199 | 350 | 196 | 246 | 271 | 260 | 230 | 293 | 330 | 283 | 391 | 213 | 229 | 122 | 148 | 0 | 586 | 97 | 240 | 403 | 427 | 110 | 265 |
| CZE | 339 | 386 | 728 | 348 | 897 | 612 | 584 | 647 | 722 | 880 | 1142 | 1144 | 706 | 741 | 216 | 224 | 201 | 0 | 144 | 399 | 470 | 699 | 184 | 411 |
| EST | 44 | 54 | 73 | 35 | 102 | 86 | 56 | 52 | 75 | 96 | 118 | 129 | 67 | 98 | 21 | 22 | 27 | 78 | 0 | 68 | 76 | 104 | 53 | 109 |
| IRL | 375 | 377 | 416 | 349 | 386 | 431 | 394 | 415 | 782 | 442 | 607 | 527 | 279 | 296 | 274 | 224 | 163 | 300 | 36 | 0 | 199 | 367 | 80 | 174 |
| KOR | 221 | 180 | 610 | 187 | 255 | 292 | 336 | 243 | 372 | 490 | 311 | 931 | 330 | 351 | 120 | 176 | 209 | 326 | 31 | 139 | 0 | 416 | 88 | 248 |
| PRT | 366 | 499 | 865 | 386 | 613 | 656 | 705 | 595 | 762 | 841 | 867 | 1115 | 549 | 706 | 219 | 299 | 227 | 573 | 65 | 319 | 351 | 0 | 120 | 363 |
| SVN | 69 | 96 | 130 | 75 | 243 | 145 | 109 | 101 | 133 | 195 | 175 | 154 | 90 | 160 | 40 | 40 | 50 | 135 | 28 | 64 | 54 | 95 | 0 | 100 |
| LVA | 105 | 131 | 275 | 116 | 448 | 234 | 187 | 152 | 243 | 357 | 289 | 546 | 221 | 325 | 68 | 81 | 84 | 257 | 58 | 100 | 144 | 285 | 58 | 0 |

HOL
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common bulls below diagonal
common three quarter sib group above diagonal

|  | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | NZL | ZAF | JPN | CZE | EST | IRL | KOR | SVN | PRT | LVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0 | 488 | 876 | 451 | 781 | 758 | 623 | 804 | 882 | 660 | 887 | 1064 | 466 | 560 | 493 | 306 | 553 | 533 | 90 | 417 | 313 | 129 | 485 | 235 |
| BEL | 418 | 0 | 648 | 514 | 823 | 660 | 588 | 765 | 729 | 668 | 1021 | 759 | 413 | 571 | 280 | 247 | 418 | 527 | 93 | 400 | 260 | 159 | 502 | 234 |
| CAN | 794 | 613 | 0 | 808 | 1779 | 1142 | 1281 | 1303 | 1551 | 1719 | 1315 | 3121 | 898 | 1123 | 369 | 375 | 1142 | 1068 | 155 | 441 | 661 | 202 | 863 | 470 |
| CHE | 400 | 514 | 702 | 0 | 860 | 569 | 550 | 580 | 693 | 701 | 808 | 881 | 370 | 528 | 243 | 218 | 373 | 479 | 77 | 350 | 262 | 127 | 431 | 233 |
| DEU | 432 | 697 | 742 | 633 | 0 | 1916 | 1318 | 1970 | 1637 | 2099 | 2250 | 2511 | 965 | 1566 | 412 | 356 | 1106 | 1500 | 212 | 538 | 505 | 302 | 888 | 637 |
| DFS | 497 | 577 | 830 | 513 | 942 | 0 | 949 | 1419 | 1331 | 1258 | 1618 | 1645 | 729 | 1126 | 457 | 383 | 793 | 1061 | 163 | 537 | 435 | 219 | 772 | 414 |
| ESP | 476 | 569 | 803 | 452 | 631 | 674 | 0 | 1104 | 1069 | 1251 | 1074 | 1505 | 710 | 907 | 323 | 368 | 837 | 863 | 133 | 414 | 477 | 185 | 742 | 381 |
| FRA | 491 | 698 | 751 | 496 | 718 | 630 | 732 | 0 | 1405 | 1388 | 1761 | 2241 | 801 | 1353 | 483 | 356 | 1072 | 1131 | 145 | 528 | 475 | 181 | 754 | 385 |
| GBR | 735 | 723 | 1567 | 689 | 869 | 917 | 868 | 791 | 0 | 1490 | 1634 | 2068 | 791 | 1121 | 478 | 394 | 876 | 1022 | 154 | 729 | 493 | 213 | 831 | 433 |
| ITA | 540 | 661 | 1475 | 645 | 1125 | 983 | 922 | 730 | 1266 | 0 | 1503 | 2345 | 896 | 1316 | 323 | 340 | 963 | 1190 | 186 | 469 | 577 | 258 | 878 | 529 |
| NLD | 728 | 1118 | 1161 | 790 | 1328 | 1182 | 915 | 914 | 1362 | 1268 | 0 | 2163 | 802 | 1316 | 606 | 382 | 889 | 1352 | 193 | 663 | 455 | 246 | 877 | 463 |
| USA | 880 | 646 | 3119 | 808 | 976 | 1013 | 981 | 1027 | 1885 | 1870 | 1715 | 0 | 1164 | 1571 | 539 | 466 | 1671 | 1535 | 203 | 569 | 817 | 230 | 1099 | 652 |
| HUN | 330 | 335 | 793 | 310 | 579 | 521 | 550 | 474 | 638 | 759 | 606 | 1053 | 0 | 741 | 275 | 299 | 598 | 835 | 116 | 334 | 417 | 146 | 574 | 322 |
| POL | 358 | 448 | 833 | 378 | 858 | 727 | 576 | 730 | 842 | 1003 | 999 | 1300 | 568 | 0 | 313 | 291 | 740 | 1083 | 183 | 402 | 484 | 232 | 768 | 481 |
| NZL | 395 | 216 | 316 | 203 | 258 | 293 | 262 | 236 | 374 | 265 | 539 | 453 | 205 | 192 | 0 | 205 | 314 | 332 | 47 | 334 | 177 | 66 | 285 | 132 |
| ZAF | 280 | 210 | 348 | 191 | 255 | 301 | 341 | 252 | 366 | 300 | 344 | 494 | 257 | 216 | 187 | 0 | 306 | 301 | 52 | 237 | 229 | 76 | 314 | 136 |
| JPN | 277 | 223 | 386 | 212 | 265 | 298 | 299 | 256 | 336 | 349 | 320 | 444 | 239 | 238 | 145 | 190 | 0 | 728 | 109 | 328 | 484 | 138 | 542 | 305 |
| CZE | 339 | 389 | 728 | 348 | 897 | 612 | 589 | 647 | 722 | 880 | 1142 | 1144 | 706 | 741 | 216 | 224 | 218 | 0 | 144 | 399 | 468 | 214 | 699 | 411 |
| EST | 44 | 54 | 73 | 35 | 102 | 86 | 57 | 52 | 75 | 96 | 118 | 129 | 67 | 98 | 21 | 22 | 27 | 78 | 0 | 68 | 76 | 57 | 104 | 109 |
| IRL | 375 | 383 | 416 | 349 | 386 | 431 | 397 | 415 | 782 | 442 | 607 | 527 | 279 | 296 | 274 | 225 | 186 | 300 | 36 | 0 | 198 | 104 | 368 | 174 |
| KOR | 220 | 180 | 606 | 187 | 255 | 292 | 335 | 241 | 371 | 487 | 308 | 925 | 326 | 349 | 120 | 176 | 223 | 326 | 31 | 139 | 0 | 101 | 414 | 248 |
| SVN | 87 | 124 | 148 | 91 | 270 | 172 | 133 | 118 | 160 | 222 | 209 | 177 | 105 | 181 | 47 | 53 | 66 | 156 | 32 | 79 | 62 | 0 | 148 | 117 |
| PRT | 367 | 505 | 866 | 388 | 614 | 658 | 714 | 597 | 766 | 844 | 871 | 1119 | 552 | 709 | 220 | 300 | 255 | 575 | 65 | 321 | 350 | 115 | 0 | 363 |
| LVA | 105 | 131 | 275 | 116 | 448 | 234 | 192 | 152 | 243 | 357 | 289 | 546 | 221 | 325 | 68 | 81 | 88 | 257 | 58 | 100 | 144 | 64 | 286 | 0 |

HOL
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common bulls below diagonal
common three quarter sib group above diagonal

|  | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | ZAF | JPN | CZE | EST | IRL | KOR | SVN | PRT | LVA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0 | 443 | 794 | 451 | 780 | 757 | 621 | 535 | 879 | 660 | 794 | 1063 | 464 | 521 | 258 | 515 | 417 | 89 | 402 | 231 | 126 | 482 | 213 |
| BEL | 409 | 0 | 599 | 496 | 779 | 610 | 555 | 597 | 668 | 655 | 874 | 681 | 388 | 527 | 207 | 375 | 436 | 90 | 362 | 207 | 155 | 485 | 213 |
| CAN | 741 | 592 | 0 | 785 | 1718 | 1046 | 1213 | 978 | 1457 | 1709 | 1177 | 2927 | 876 | 1072 | 312 | 1020 | 934 | 152 | 411 | 560 | 198 | 846 | 442 |
| CHE | 400 | 500 | 687 | 0 | 860 | 568 | 552 | 507 | 693 | 701 | 780 | 881 | 368 | 510 | 198 | 366 | 412 | 77 | 343 | 216 | 123 | 428 | 214 |
| DEU | 432 | 675 | 740 | 633 | 0 | 1915 | 1322 | 1626 | 1635 | 2099 | 2188 | 2510 | 961 | 1531 | 323 | 1080 | 1304 | 211 | 522 | 442 | 298 | 887 | 610 |
| DFS | 497 | 563 | 827 | 513 | 942 | 0 | 945 | 1020 | 1325 | 1258 | 1502 | 1643 | 724 | 1073 | 331 | 750 | 871 | 162 | 510 | 350 | 217 | 766 | 388 |
| ESP | 478 | 556 | 792 | 453 | 637 | 679 | 0 | 896 | 1068 | 1255 | 1023 | 1505 | 711 | 878 | 323 | 803 | 758 | 132 | 404 | 401 | 185 | 746 | 362 |
| FRA | 388 | 568 | 624 | 432 | 608 | 542 | 634 | 0 | 1035 | 1249 | 1213 | 1452 | 666 | 1187 | 229 | 753 | 895 | 130 | 385 | 360 | 172 | 628 | 335 |
| GBR | 734 | 686 | 1494 | 688 | 869 | 915 | 875 | 637 | 0 | 1490 | 1518 | 2060 | 788 | 1075 | 340 | 829 | 866 | 153 | 684 | 409 | 209 | 825 | 406 |
| ITA | 540 | 658 | 1474 | 645 | 1125 | 983 | 925 | 678 | 1266 | 0 | 1487 | 2345 | 896 | 1301 | 332 | 957 | 1119 | 186 | 463 | 519 | 255 | 878 | 514 |
| NLD | 669 | 960 | 1084 | 761 | 1307 | 1153 | 879 | 721 | 1284 | 1259 | 0 | 1832 | 764 | 1242 | 315 | 787 | 1181 | 190 | 600 | 371 | 242 | 850 | 429 |
| USA | 880 | 621 | 3006 | 808 | 976 | 1012 | 984 | 693 | 1884 | 1870 | 1438 | 0 | 1161 | 1519 | 400 | 1539 | 1326 | 203 | 541 | 686 | 226 | 1095 | 621 |
| HUN | 330 | 322 | 787 | 310 | 579 | 521 | 552 | 414 | 637 | 759 | 592 | 1053 | 0 | 714 | 272 | 583 | 719 | 116 | 320 | 363 | 143 | 573 | 305 |

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  POL  344  431  812  365  842  704  553  680  819  995  964 1270  550    0  252  704  979  181  365  437  228  747  461
  ZAF  243  192  305  176  237  278  301  178  318  296  286  412  241  200    0  253  239   51  197  165   74  298  121
  JPN  272  221  383  211  264  296  294  227  331  348  313  436  237  231  178    0  617  107  301  398  137  535  285
  CZE  287  333  652  292  793  532  492  502  610  831 1030  992  597  685  176  202    0  137  318  398  204  626  382
  EST   44   53   73   35  102   86   57   48   75   96  117  129   67   97   22   27   73    0   66   71   57  104  103
  IRL  373  368  413  346  384  429  400  326  748  440  577  521  277  283  195  185  245   36    0  146  102  354  156
  KOR  160  156  519  161  224  249  272  215  297  438  253  773  278  327  119  189  281   29  105    0   92  357  223
  SVN   85  120  146   89  267  171  133  113  158  219  205  175  103  179   53   65  151   32   78   58    0  146  111
  PRT  364  495  846  385  615  655  717  539  762  845  850 1118  551  697  290  253  515   65  317  304  115    0  347
  LVA   95  120  261  106  427  220  181  139  225  347  268  525  208  313   73   84  244   53   90  132   61  273    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal
       AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
-------------------------------------------------------------------------------------
  AUS    0  461  876  451  529  757  631  799  882  660  851 1064  465  559  306  553  533   90  416  314  101  490  235
  BEL  415    0  626  506  635  635  580  710  696  661  925  711  398  558  235  396  513   93  384  253  126  498  232
  CAN  794  603    0  808 1405 1142 1286 1287 1551 1719 1270 3121  897 1121  375 1142 1068  155  441  662  175  868  470
  CHE  400  510  702    0  701  569  556  576  693  699  798  881  370  526  218  373  478   77  350  262  101  435  233
  DEU  357  572  663  520    0 1326 1068 1373 1202 1833 1664 1833  741 1297  238  805 1141  186  381  416  257  688  582
  DFS  497  572  830  513  805    0  964 1391 1329 1257 1563 1643  727 1123  383  793 1061  163  536  436  185  778  414
  ESP  483  581  810  458  519  690    0 1110 1085 1261 1071 1520  717  919  372  841  876  135  426  481  157  760  385
  FRA  490  681  751  496  561  629  761    0 1390 1388 1591 2200  798 1344  355 1058 1126  143  522  470  155  758  384
  GBR  735  706 1567  689  712  917  891  791    0 1490 1589 2065  790 1117  393  875 1022  154  723  495  178  836  433
  ITA  540  661 1475  644 1018  983  935  730 1266    0 1492 2345  896 1315  340  963 1190  186  469  577  229  879  529
  NLD  719 1018 1148  788 1093 1179  934  872 1341 1266    0 1992  786 1293  370  848 1342  192  649  451  205  874  457
  USA  880  631 3119  808  804 1012  994  991 1885 1870 1657    0 1163 1567  466 1670 1535  203  567  817  197 1105  652
  HUN  330  331  793  310  457  520  557  474  638  759  604 1053    0  740  298  598  834  116  333  417  127  576  322
  POL  358  445  833  377  762  726  591  730  841 1003  991 1300  567    0  290  740 1080  181  400  483  204  771  480
  ZAF  280  208  348  191  174  301  343  252  366  300  338  494  257  216    0  305  301   52  237  229   56  321  136
  JPN  277  222  385  211  231  297  300  254  334  348  316  442  238  237  189    0  728  109  328  485  113  547  305
  CZE  339  386  728  348  723  612  606  647  722  880 1140 1144  706  741  224  217    0  143  399  468  184  702  411
  EST   44   54   73   35   89   86   59   52   75   96  118  129   67   97   22   27   78    0   68   76   53  103  109
  IRL  375  377  416  349  301  431  413  415  776  442  603  527  279  296  225  186  300   36    0  199   80  369  174
  KOR  220  180  607  187  228  292  336  240  371  487  305  920  326  349  176  221  325   31  139    0   87  417  248
  SVN   69   96  130   75  243  145  113  101  133  195  175  154   90  160   40   50  135   28   64   53    0  120  100
  PRT  369  505  871  391  520  662  731  600  772  845  871 1127  557  712  301  254  578   64  321  351   95    0  364
  LVA  105  131  275  116  426  234  199  152  243  357  288  546  221  325   81   88  257   58  100  143   58  286    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal
       AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
-------------------------------------------------------------------------------------
  AUS    0  481  876  451  781  757  631  753  882  660  832 1064  466  559  493  306  553  533   90  417  315  126  485  235
  BEL  417    0  644  513  819  655  598  740  723  666  968  744  410  568  276  245  411  525   93  398  261  156  502  234
  CAN  794  613    0  808 1778 1142 1286 1225 1551 1719 1241 3121  898 1123  369  375 1142 1068  155  441  665  199  863  470
  CHE  400  513  702    0  860  569  556  577  693  701  789  881  370  528  243  218  373  479   77  350  262  125  431  233
  DEU  432  697  742  633    0 1916 1335 1952 1637 2099 2211 2511  965 1565  412  356 1106 1500  212  538  508  299  888  637
  DFS  497  576  830  513  942    0  964 1340 1330 1258 1539 1644  728 1125  456  383  793 1061  163  536  437  216  772  414
  ESP  483  589  810  458  653  690    0 1084 1086 1261 1058 1520  718  921  331  372  842  876  135  426  483  186  753  385
  FRA  489  694  748  496  717  627  761    0 1350 1383 1556 2041  787 1342  450  341  994 1119  143  510  460  179  746  380
  GBR  735  723 1567  689  869  917  891  786    0 1490 1568 2067  791 1121  478  394  876 1022  154  727  496  210  831  433
  ITA  540  661 1475  645 1125  983  935  729 1266    0 1488 2345  896 1316  323  340  963 1190  186  469  581  255  878  529
  NLD  696 1057 1105  766 1306 1157  908  861 1309 1256    0 1929  781 1294  580  363  819 1333  190  649  444  243  859  453
  USA  880  645 3119  808  976 1013  994  956 1885 1870 1471    0 1164 1571  539  466 1671 1535  203  568  823  227 1099  652
  HUN  330  335  793  310  579  521  557  473  638  759  589 1053    0  741  275  299  598  835  116  334  421  144  574  322
  POL  358  448  833  378  858  727  592  730  842 1003  990 1300  568    0  313  291  740 1083  183  402  487  229  768  481
  NZL  395  216  316  203  258  293  268  234  374  265  518  453  205  192    0  205  314  332   47  334  178   66  285  132
  ZAF  280  210  348  191  255  301  343  250  366  300  324  494  257  216  187    0  306  301   52  237  229   75  314  136
  JPN  277  223  386  212  265  298  302  256  336  349  317  444  239  238  145  190    0  728  109  328  486  136  542  305
  CZE  339  389  728  348  897  612  606  645  722  880 1125 1144  706  741  216  224  218    0  144  399  470  212  699  411
  EST   44   54   73   35  102   86   59   52   75   96  117  129   67   98   21   22   27   78    0   68   76   57  104  109
  IRL  375  383  416  349  386  431  413  413  780  442  592  527  279  296  274  225  186  300   36    0  200  102  368  174
  KOR  221  180  609  187  255  292  339  242  372  489  301  930  329  351  120  176  223  326   31  139    0  101  416  249
  SVN   85  123  146   90  268  171  136  117  158  220  206  175  104  180   47   53   65  155   32   78   61    0  147  115
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  PRT  367  504  866  387  614  657  724  594  764  843  854 1117  551  708  220  300  255  573   65  320  350  115    0  363
  LVA  105  131  275  116  448  234  199  152  243  357  285  546  221  325   68   81   88  257   58  100  144   64  285    0
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HOL
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 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
      ------------------------------------------------------------------------------------------------------------------------
  AUS    0  481  876  451  781  711  624  800  882  660  861 1064  466  560  493  306  554  533   90  417  315  128  483  235
  BEL  417    0  644  513  819  644  587  751  723  666  982  744  410  568  276  245  412  525   93  398  261  158  500  234
  CAN  794  613    0  808 1779 1064 1282 1288 1551 1719 1284 3121  898 1123  369  375 1143 1068  155  441  666  201  860  470
  CHE  400  513  702    0  860  565  552  580  693  701  802  881  370  528  243  218  373  479   77  350  262  126  430  233
  DEU  432  697  742  633    0 1863 1320 1966 1637 2099 2237 2511  965 1566  412  356 1107 1500  212  538  509  301  885  637
  DFS  497  576  830  513  942    0  908 1309 1272 1252 1542 1551  712 1105  429  356  740 1027  161  519  425  218  761  410
  ESP  476  570  804  453  632  675    0 1094 1071 1252 1061 1507  711  909  324  370  839  864  133  415  480  184  740  382
  FRA  491  697  751  496  717  629  734    0 1392 1388 1639 2202  799 1350  479  355 1060 1126  144  523  474  180  749  384
  GBR  735  722 1566  689  868  916  867  790    0 1490 1605 2067  791 1121  478  394  877 1022  154  727  497  212  828  433
  ITA  540  661 1475  645 1125  982  923  730 1265    0 1499 2345  896 1316  323  340  964 1190  186  469  582  257  876  529
  NLD  724 1088 1154  789 1326 1181  914  890 1349 1267    0 2035  793 1307  593  372  856 1347  192  656  457  245  870  458
  USA  880  645 3119  808  976 1012  982  992 1885 1870 1673    0 1164 1571  539  466 1672 1535  203  568  825  229 1096  652
  HUN  330  335  793  310  579  521  551  474  638  759  606 1053    0  741  275  299  598  835  116  334  422  145  574  322
  POL  358  448  833  378  858  727  578  730  842 1003  998 1300  568    0  313  291  740 1083  183  402  488  231  765  481
  NZL  395  216  316  203  258  293  262  236  374  265  537  453  205  192    0  205  314  332   47  334  178   66  284  132
  ZAF  280  210  348  191  255  301  342  252  366  300  342  494  257  216  187    0  307  301   52  237  229   75  313  136
  JPN  277  224  387  212  266  299  301  257  337  350  320  445  239  238  145  191    0  729  109  328  488  137  542  305
  CZE  339  389  728  348  897  612  590  647  722  880 1141 1144  706  741  216  224  218    0  144  399  471  213  698  411
  EST   44   54   73   35  102   86   57   52   75   96  118  129   67   98   21   22   27   78    0   68   76   57  103  109
  IRL  375  383  416  349  386  431  398  415  780  442  604  527  279  296  274  225  186  300   36    0  200  103  367  174
  KOR  221  180  610  187  255  292  337  243  372  490  308  932  330  351  120  177  224  326   31  139    0  101  417  249
  SVN   86  123  147   90  269  171  132  117  159  221  208  176  104  180   47   53   65  155   32   78   61    0  147  116
  PRT  366  502  865  386  613  653  711  595  762  842  865 1116  550  707  219  300  255  573   65  319  351  115    0  363
  LVA  105  131  275  116  448  234  193  152  243  357  288  546  221  325   68   81   88  257   58  100  144   64  285    0
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HOL
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 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
      ------------------------------------------------------------------------------------------------------------------------
  AUS    0  481  876  451  781  758  635  804  882  660  887 1064  466  560  493  306  553  533   90  417  313  129  485  235
  BEL  417    0  644  513  819  656  601  754  723  666  990  744  410  568  276  245  411  525   93  398  260  159  502  234
  CAN  794  613    0  808 1779 1142 1290 1303 1551 1719 1315 3121  898 1123  369  375 1142 1068  155  441  661  202  863  470
  CHE  400  513  702    0  860  569  558  580  693  701  808  881  370  528  243  218  373  479   77  350  262  127  431  233
  DEU  432  697  742  633    0 1916 1345 1970 1637 2099 2250 2511  965 1566  412  383  505  302  888  637
  DFS  497  576  831  513  942    0  971 1419 1331 1258 1618 1645  729 1126  457  383  793 1061  163  537  435  219  772  414
  ESP  485  593  813  460  669  698    0 1131 1092 1268 1105 1526  720  929  334  372  846  881  137  430  481  189  758  387
  FRA  491  697  751  496  718  630  777    0 1405 1388 1761 2241  801 1353  483  356 1072 1131  145  528  475  181  754  385
  GBR  735  723 1567  689  869  917  899  791    0 1490 1634 2068  791 1121  478  394  876 1022  154  729  493  213  831  433
  ITA  540  661 1475  645 1125  983  944  730 1266    0 1503 2345  896 1316  323  340  963 1190  186  469  577  258  878  529
  NLD  728 1095 1161  790 1328 1182  953  914 1362 1268    0 2163  802 1316  606  382  889 1352  193  663  455  246  877  463
  USA  880  645 3119  808  976 1014  997 1027 1885 1870 1715    0 1164 1571  539  466 1671 1535  203  569  816  230 1099  652
  HUN  330  335  793  310  579  522  560  474  638  759  606 1053    0  741  275  299  598  835  116  334  417  146  574  322
  POL  358  448  833  378  858  727  601  730  842 1003  999 1300  568    0  313  291  740 1083  183  402  484  232  768  481
  NZL  395  216  316  203  258  293  270  236  374  265  539  453  205  192    0  205  314  332   47  334  177   66  285  132
  ZAF  280  210  348  191  255  302  343  252  366  300  344  494  257  216  187    0  306  301   52  237  229   76  314  136
  JPN  277  223  386  212  265  298  303  256  336  349  320  444  239  238  145  190    0  728  109  328  484  138  542  305
  CZE  339  389  728  348  897  612  610  647  722  880 1142 1144  706  741  216  224  218    0  144  399  468  214  699  411
  EST   44   54   73   35  102   86   61   52   75   96  118  129   67   98   21   22   27   78    0   68   76   57  104  109
  IRL  375  383  416  349  386  431  417  415  782  442  607  527  279  296  274  225  186  300   36    0  198  104  368  174
  KOR  220  180  606  187  255  292  338  241  371  487  308  924  326  349  120  176  223  326   31  139    0  101  414  248
  SVN   87  124  148   91  270  172  138  118  160  222  209  177  105  181   47   53   66  156   32   79   62    0  148  117
  PRT  367  505  866  388  614  658  729  597  766  844  871 1119  552  709  220  300  255  575   65  321  350  115    0  363
  LVA  105  131  275  116  448  234  206  152  243  357  289  546  221  325   68   81   88  257   58  100  144   64  286    0
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HOL
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 common bulls below diagonal
 common three quarter sib group above diagonal
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        AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
     ---------------------------------------------------------------------------------------------------------------------
AUS     0  484  876  451  781  758  621  804  882  660  887 1064  466  560  306  555  533   90  416  315  129  484  235
BEL   416    0  644  512  817  655  585  758  723  667 1013  753  410  568  244  417  525   93  395  258  159  500  234
CAN   794  609    0  808 1779 1142 1280 1303 1551 1719 1315 3121  898 1123  375 1145 1068  155  441  665  202  861  470
CHE   400  512  702    0  860  569  549  580  693  701  808  881  370  528  218  375  479   77  350  262  127  430  233
DEU   432  696  742  633    0 1916 1311 1970 1637 2099 2250 2511  965 1566  356 1109 1500  212  538  508  302  886  637
DFS   497  576  831  513  942    0  945 1419 1331 1258 1618 1645  729 1126  383  795 1061  163  537  437  219  770  414
ESP   474  564  802  449  623  670    0 1100 1067 1249 1071 1502  710  905  367  839  861  133  413  478  184  740  380
FRA   491  696  751  496  718  630  726    0 1405 1388 1761 2241  801 1353  356 1075 1131  145  528  477  181  752  385
GBR   735  719 1567  689  869  917  864  791    0 1490 1634 2068  791 1121  394  879 1022  154  726  497  213  830  433
ITA   540  661 1475  645 1125  983  918  730 1266    0 1503 2345  896 1316  340  966 1190  186  469  581  258  876  529
NLD   728 1107 1161  790 1328 1182  910  914 1362 1268    0 2163  802 1316  382  892 1352  193  663  460  246  875  463
USA   880  642 3119  808  976 1014  978 1027 1885 1870 1715    0 1164 1571  466 1674 1535  203  569  823  230 1097  652
HUN   330  334  793  310  579  522  549  474  638  759  606 1053    0  741  299  599  835  116  334  421  146  573  322
POL   358  448  833  378  858  727  574  730  842 1003  999 1300  568    0  291  741 1083  183  402  487  232  766  481
ZAF   280  210  348  191  255  302  339  252  366  300  344  494  257  216    0  307  301   52  237  229   76  314  136
JPN   281  227  390  215  268  301  303  261  342  352  326  450  241  239  193    0  729  109  328  488  138  541  305
CZE   339  389  728  348  897  612  586  647  722  880 1142 1144  706  741  224  220    0  144  399  471  214  699  411
EST    44   54   73   35  102   86   57   52   75   96  118  129   67   98   22   27   78    0   68   76   57  104  109
IRL   375  382  416  349  386  431  395  415  779  442  607  527  279  296  225  187  300   36    0  200  104  367  174
KOR   221  180  610  187  255  292  336  243  372  490  311  932  330  351  177  224  326   31  139    0  102  417  249
SVN    87  124  148   91  270  172  131  118  160  222  209  177  105  181   53   66  156   32   79   62    0  148  117
PRT   366  501  865  386  613  656  708  595  762  841  867 1115  549  706  300  257  573   65  319  351  115    0  363
LVA   105  131  275  116  448  234  190  152  243  357  289  546  221  325   81   88  257   58  100  144   64  285    0
     ---------------------------------------------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
        AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
     ---------------------------------------------------------------------------------------------------------------------------
AUS     0  481  876  451  781  758  624  804  882  660  887 1064  466  560  493  306  555  533   89  417  315  125  484  213
BEL   417    0  644  513  819  656  587  754  723  666  990  744  410  568  276  245  414  525   93  398  261  155  501  215
CAN   794  613    0  808 1779 1142 1281 1303 1551 1719 1315 3121  898 1123  369  375 1145 1068  155  441  666  197  861  444
CHE   400  513  702    0  860  569  551  580  693  701  808  881  370  528  243  218  375  479   77  350  262  123  430  214
DEU   432  697  742  633    0 1916 1319 1970 1637 2099 2250 2511  965 1566  412  356 1109 1500  211  538  509  297  886  609
DFS   497  576  831  513  942    0  949 1419 1331 1258 1618 1645  729 1126  457  383  795 1061  162  537  438  215  770  388
ESP   476  570  803  452  631  674    0 1105 1070 1251 1075 1506  710  908  324  369  839  863  132  414  479  183  741  360
FRA   491  697  751  496  718  630  733    0 1405 1388 1761 2241  801 1353  483  356 1075 1131  145  528  477  178  752  363
GBR   735  723 1567  689  869  917  868  791    0 1490 1634 2068  791 1121  478  394  879 1022  154  729  497  208  830  405
ITA   540  661 1475  645 1125  983  922  730 1266    0 1503 2345  896 1316  323  340  966 1190  186  469  582  255  876  514
NLD   728 1095 1161  790 1328 1182  915  914 1362 1268    0 2163  802 1316  606  382  892 1352  192  663  462  241  875  430
USA   880  645 3119  808  976 1013  981 1027 1885 1870 1715    0 1164 1571  539  466 1674 1535  203  569  825  225 1097  621
HUN   330  335  793  310  579  522  550  474  638  759  606 1053    0  741  275  299  599  835  116  334  422  143  573  305
POL   358  448  833  378  858  727  577  730  842 1003  999 1300  568    0  313  291  741 1083  182  402  488  228  766  460
NZL   395  216  316  203  258  293  262  236  374  265  539  453  205  192    0  205  314  332   47  334  178   66  284  114
ZAF   280  210  348  191  255  302  341  252  366  300  344  494  257  216  187    0  307  301   52  237  229   75  314  123
JPN   280  227  390  215  268  301  303  260  341  352  325  449  241  239  146  193    0  729  109  328  488  136  541  287
CZE   339  389  728  348  897  612  589  647  722  880 1142 1144  706  741  216  224  219    0  144  399  471  210  699  396
EST    44   54   73   35  102   86   57   52   75   96  118  129   67   98   21   22   27   78    0   68   76   56  104  103
IRL   375  383  416  349  386  431  397  415  782  442  607  527  279  296  274  225  187  300   36    0  200  102  367  160
KOR   221  180  610  187  255  292  336  243  372  490  311  932  330  351  120  177  224  326   31  139    0  101  417  239
SVN    86  123  147   91  267  171  133  118  159  220  208  175  104  180   47   53   66  156   32   79   62    0  147  110
PRT   366  502  865  386  613  656  710  595  762  841  867 1115  549  706  219  300  257  573   65  319  351  115    0  346
LVA    95  120  261  106  426  220  179  145  225  347  268  525  208  313   58   73   84  249   53   90  142   61  273    0
     ---------------------------------------------------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
        AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA  NZL
     ---------------------------------------------------------------------------------------------------------------------------
AUS     0  488  876  451  781  758  621  804  882  660  887 1064  454  560  306  547  533   90  416  316  125  484  235   44
BEL   418    0  648  514  823  660  588  765  729  668 1021  759  406  571  247  420  527   93  400  262  155  501  234   33
CAN   794  613    0  808 1779 1142 1281 1303 1551 1719 1315 3121  884 1123  375 1138 1068  155  441  667  197  861  470   51
CHE   400  514  702    0  860  569  550  580  693  701  808  881  366  528  218  375  479   77  350  263  123  430  233   38
DEU   432  697  742  633    0 1916 1312 1970 1637 2099 2250 2511  956 1566  356 1107 1500  212  538  510  297  886  637   46
DFS   497  577  831  513  942    0  946 1419 1331 1258 1618 1645  715 1126  383  789 1061  163  537  439  215  770  414   39
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  ESP   474   567   803   450   625   671     0  1101  1067  1250  1072  1503   701   906   367   829   862   133   413   480   182   740   380    42
  FRA   491   698   751   496   718   630   727     0  1405  1388  1761  2241   784  1353   356  1062  1131   145   528   479   178   752   385    38
  GBR   735   723  1567   689   869   917   865   791     0  1490  1634  2068   777  1121   394   874  1022   154   726   498   208   830   433    47
  ITA   540   661  1475   645  1125   983   920   730  1266     0  1503  2345   895  1316   340   965  1190   186   469   583   255   876   529    45
  NLD   728  1118  1161   790  1328  1182   912   914  1362  1268     0  2163   785  1316   382   886  1352   193   663   463   241   875   463    65
  USA   880   646  3119   808   976  1014   979  1027  1885  1870  1715     0  1135  1571   466  1654  1535   203   569   826   225  1097   652    51
  HUN   318   326   779   306   572   513   535   466   622   756   593  1027     0   736   291   590   823   116   328   421   143   571   322    33
  POL   358   448   833   378   858   727   575   730   842  1003   999  1300   564     0   291   739  1083   183   402   488   228   766   481    38
  ZAF   280   210   348   191   255   302   339   252   366   300   344   494   246   216     0   304   301    52   237   230    75   314   136    18
  JPN   280   227   390   215   268   301   303   260   341   352   325   449   235   239   193     0   728   108   326   489   136   541   305    35
  CZE   339   389   728   348   897   612   587   647   722   880  1142  1144   695   741   224   219     0   144   399   471   210   699   411    41
  EST    44    54    73    35   102    86    57    52    75    96   118   129    67    98    22    27    78     0    68    76    56   104   109    14
  IRL   375   383   416   349   386   431   396   415   779   442   607   527   271   296   225   187   300    36     0   201   102   367   174    31
  KOR   221   181   611   187   255   292   336   243   372   490   312   936   328   351   177   224   326    31   139     0   101   417   249    31
  SVN    86   123   147    91   267   171   131   118   159   220   208   175   104   180    53    66   156    32    79    62     0   147   114    18
  PRT   366   502   865   386   613   656   709   595   762   841   867  1115   546   706   300   257   573    65   319   351   115     0   363    26
  LVA   105   131   275   116   448   234   191   152   243   357   289   546   221   325    81    88   257    58   100   145    64   285     0    21
  NZL    48    32    54    33    41    38    39    36    46    43    63    54    22    25    18    32    32     3    28    26    10    25    10     0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal
        AUS   BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   POL   NZL   JPN   CZE   EST   IRL   KOR   SVN   PRT   ZAF   HUN   LVA
--------------------------------------------------------------------------------------
  AUS     0   474   875   434   778   633   626   802   746   659   733   784   457   486   358   416    89   350   197   125   401   165   311   235
  BEL   416     0   636   487   807   600   588   739   642   664   876   640   483   271   311   441    93   338   180   155   429   144   298   234
  CAN   793   608     0   771  1773   985  1282  1302  1372  1717  1164  2708  1019   364   842   938   154   376   487   197   744   226   728   470
  CHE   396   489   672     0   776   525   545   565   647   682   688   793   453   238   310   398    76   307   189   120   365   133   287   228
  DEU   431   695   741   582     0  1775  1322  1946  1481  2097  2110  2202  1439   405   883  1301   211   468   382   297   780   214   752   637
  DFS   461   538   800   471   909     0   845  1189  1086  1220  1398  1249   969   368   553   846   156   423   292   211   647   211   524   401
  ESP   477   574   805   450   636   626     0  1111   960  1254   978  1335   811   325   657   757   132   346   349   184   646   218   550   383
  FRA   491   694   751   487   703   591   743     0  1121  1386  1363  1545  1191   474   737   949   143   414   332   178   628   190   597   385
  GBR   649   657  1411   633   817   813   759   683     0  1448  1335  1694   975   370   622   840   142   535   347   206   688   220   577   416
  ITA   540   661  1475   632  1125   958   925   730  1240     0  1466  2243  1254   321   856  1119   185   438   448   255   798   241   780   529
  NLD   637   952  1046   679  1271  1084   838   797  1130  1247     0  1553  1156   482   636  1164   186   526   316   238   725   211   588   446
  USA   710   606  2848   729   924   913   875   761  1664  1849  1269     0  1376   366  1113  1276   193   443   583   222   892   257   865   630
  POL   303   384   775   314   770   648   486   644   748   953   891  1179     0   235   614   947   170   318   387   218   665   188   598   455
  NZL   392   214   314   200   257   262   264   236   306   265   441   325   148     0   199   242    46   269   109    65   216   101   155   131
  JPN   239   197   348   194   244   268   259   228   291   328   281   389   215   121     0   559    96   223   331   124   405   163   425   265
  CZE   287   333   652   283   792   528   492   518   603   831  1024   976   665   166   196     0   136   305   343   203   589   201   635   389
  EST    44    54    73    35   102    83    57    52    72    96   114   126    89    21    27    73     0    61    67    56    96    44   104   109
  IRL   329   344   375   312   359   370   346   349   552   421   511   452   244   231   162   243    36     0   119   100   295   125   224   166
  KOR   148   138   457   144   196   214   233   189   253   381   219   672   294    79   167   240    28    87     0    89   292   126   297   200
  SVN    86   123   147    90   267   169   134   118   157   220   207   175   170    47    62   152    32    79    57     0   141    66   134   114
  PRT   307   425   722   321   536   545   590   497   618   768   710   908   621   167   213   484    60   260   254   109     0   205   425   340
  ZAF   157   130   210   110   151   186   191   153   195   208   183   261   159    93   120   153    20   118    87    46   195     0   170   103
  HUN   237   241   656   237   446   394   397   365   460   648   445   801   474   114   187   537    60   194   229    97   416   151     0   287
  LVA   105   131   275   114   448   233   195   152   239   357   283   535   310    68    84   247    58   100   119    64   267    63   194     0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal
        AUS   BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   HUN   POL   NZL   JPN   CZE   EST   IRL   KOR   SVN   PRT
--------------------------------------------------------------------------------------
  AUS     0   488   876   451   781   758   621   681   882   660   887  1061   466   559   493   555   533    89   417   316   101   484
  BEL   418     0   646   512   822   658   590   708   727   666  1019   754   413   570   280   420   527    93   399   262   126   500
  CAN   794   613     0   808  1779  1142  1272  1144  1551  1719  1315  3104   898  1122   369  1145  1068   155   441   669   174   862
  CHE   400   514   702     0   860   569   552   559   693   701   808   877   370   527   243   375   479    77   350   263   100   430
  DEU   432   696   742   633     0  1916  1322  1854  1637  2099  2250  2503   965  1562   412  1109  1500   211   538   510   264   887
  DFS   497   577   831   513   942     0   948  1256  1331  1258  1618  1643   729  1123   457   795  1061   162   536   440   183   770
  ESP   478   576   805   453   638   679     0  1032  1072  1255  1082  1502   714   913   329   836   868   132   420   482   155   748
  FRA   474   672   718   491   670   622   735     0  1268  1358  1480  1816   756  1272   404   921  1085   141   483   450   155   712
  GBR   735   723  1567   689   869   917   876   779     0  1490  1634  2062   791  1120   478   879  1022   154   728   498   177   828
  ITA   540   661  1475   645  1125   983   925   727  1266     0  1503  2340   896  1316   323   966  1190   186   469   584   228   877
  NLD   728  1118  1161   790  1328  1182   925   845  1362  1268     0  2157   802  1314   606   892  1352   192   663   463   203   876
  USA   876   644  3093   803   969  1011   981   869  1876  1862  1708     0  1161  1566   538  1670  1529   202   566   828   196  1095
  HUN   330   335   793   310   579   522   552   471   638   759   606  1051     0   740   275   599   835   116   334   422   127   574
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  POL  358  448  833  378  858  727  581  698  842 1003  999 1295  568    0  313  740 1083  182  402  488  205  767
  NZL  395  216  316  203  258  293  265  230  374  265  539  451  205  192    0  314  332   47  334  180   55  284
  JPN  279  225  388  214  267  300  302  259  340  351  324  448  240  239  145    0  729  109  328  490  113  542
  CZE  339  389  728  348  897  612  594  631  722  880 1142 1137  706  741  216  219    0  144  399  471  182  698
  EST   44   54   73   35  102   86   57   52   75   96  118  129   67   98   21   27   78    0   68   76   53  104
  IRL  375  383  416  349  386  431  404  411  782  442  607  526  279  296  274  186  300   36    0  201   80  367
  KOR  221  181  611  187  255  292  338  240  372  490  312  936  330  351  120  224  326   31  139    0   88  417
  SVN   69   96  130   75  241  143  111  101  133  194  174  154   90  160   40   50  134   28   64   54    0  120
  PRT  366  502  865  386  613  656  716  586  762  842  868 1109  550  707  219  255  573   65  319  351   95    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal

| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | NZL | JPN | CZE | EST | IRL | SVN | PRT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0 | 488 | 876 | 451 | 781 | 758 | 627 | 804 | 882 | 660 | 887 | 1064 | 466 | 560 | 493 | 555 | 533 | 89 | 404 | 100 | 485 |
| BEL | 418 | 0 | 648 | 514 | 823 | 660 | 594 | 765 | 729 | 668 | 1021 | 759 | 413 | 571 | 280 | 421 | 527 | 93 | 388 | 125 | 502 |
| CAN | 794 | 613 | 0 | 808 | 1779 | 1142 | 1283 | 1303 | 1551 | 1719 | 1315 | 3121 | 898 | 1123 | 369 | 1145 | 1068 | 155 | 427 | 173 | 863 |
| CHE | 400 | 514 | 702 | 0 | 860 | 569 | 553 | 580 | 693 | 701 | 808 | 881 | 370 | 528 | 243 | 375 | 479 | 77 | 343 | 101 | 431 |
| DEU | 432 | 697 | 742 | 633 | 0 | 1916 | 1325 | 1970 | 1637 | 2099 | 2250 | 2511 | 965 | 1566 | 412 | 1109 | 1500 | 211 | 522 | 264 | 888 |
| DFS | 497 | 577 | 831 | 513 | 942 | 0 | 955 | 1419 | 1331 | 1258 | 1618 | 1645 | 729 | 1126 | 457 | 795 | 1061 | 162 | 513 | 183 | 772 |
| ESP | 478 | 576 | 805 | 453 | 638 | 679 | 0 | 1113 | 1078 | 1255 | 1085 | 1513 | 714 | 915 | 330 | 842 | 869 | 132 | 407 | 155 | 749 |
| FRA | 491 | 698 | 751 | 496 | 718 | 630 | 743 | 0 | 1405 | 1388 | 1761 | 2241 | 801 | 1353 | 483 | 1075 | 1131 | 144 | 499 | 155 | 754 |
| GBR | 735 | 721 | 1566 | 689 | 867 | 916 | 873 | 790 | 0 | 1490 | 1634 | 2068 | 791 | 1121 | 478 | 879 | 1022 | 154 | 691 | 177 | 831 |
| ITA | 540 | 661 | 1475 | 645 | 1125 | 983 | 925 | 730 | 1264 | 0 | 1503 | 2345 | 896 | 1316 | 323 | 966 | 1190 | 186 | 463 | 228 | 878 |
| NLD | 728 | 1118 | 1161 | 790 | 1328 | 1182 | 925 | 914 | 1360 | 1268 | 0 | 2163 | 802 | 1316 | 606 | 892 | 1352 | 192 | 627 | 203 | 877 |
| USA | 880 | 646 | 3119 | 808 | 976 | 1014 | 987 | 1027 | 1885 | 1870 | 1715 | 0 | 1164 | 1571 | 539 | 1674 | 1535 | 203 | 543 | 196 | 1099 |
| HUN | 330 | 335 | 793 | 310 | 579 | 522 | 552 | 474 | 638 | 759 | 606 | 1053 | 0 | 741 | 275 | 599 | 835 | 116 | 323 | 127 | 574 |
| POL | 358 | 448 | 833 | 378 | 858 | 727 | 581 | 730 | 842 | 1003 | 999 | 1300 | 568 | 0 | 313 | 741 | 1083 | 182 | 391 | 205 | 768 |
| NZL | 395 | 216 | 316 | 203 | 258 | 293 | 266 | 236 | 374 | 265 | 539 | 453 | 205 | 192 | 0 | 314 | 332 | 47 | 320 | 55 | 285 |
| JPN | 279 | 225 | 388 | 214 | 267 | 300 | 302 | 260 | 340 | 351 | 324 | 448 | 240 | 239 | 145 | 0 | 729 | 109 | 314 | 113 | 543 |
| CZE | 339 | 389 | 728 | 348 | 897 | 612 | 594 | 647 | 721 | 880 | 1142 | 1144 | 706 | 741 | 216 | 219 | 0 | 144 | 384 | 183 | 699 |
| EST | 44 | 54 | 73 | 35 | 102 | 86 | 57 | 52 | 75 | 96 | 118 | 129 | 67 | 98 | 21 | 27 | 78 | 0 | 67 | 53 | 104 |
| IRL | 373 | 382 | 415 | 347 | 384 | 430 | 401 | 410 | 758 | 440 | 599 | 521 | 277 | 296 | 270 | 186 | 299 | 36 | 0 | 80 | 357 |
| SVN | 69 | 97 | 130 | 76 | 241 | 144 | 112 | 102 | 133 | 195 | 176 | 154 | 91 | 161 | 40 | 51 | 135 | 28 | 65 | 0 | 121 |
| PRT | 367 | 504 | 866 | 387 | 614 | 657 | 718 | 596 | 763 | 843 | 870 | 1117 | 551 | 708 | 220 | 256 | 573 | 65 | 320 | 95 | 0 |

HOL
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common bulls below diagonal
common three quarter sib group above diagonal

| | AUS | BEL | CAN | CHE | DEU | DFS | ESP | FRA | GBR | ITA | NLD | USA | HUN | POL | JPN | CZE | EST | IRL | SVN | PRT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUS | 0 | 480 | 876 | 451 | 781 | 758 | 629 | 662 | 882 | 660 | 867 | 1062 | 454 | 558 | 545 | 533 | 89 | 403 | 101 | 491 |
| BEL | 417 | 0 | 641 | 509 | 816 | 653 | 592 | 688 | 720 | 664 | 973 | 737 | 402 | 565 | 406 | 524 | 93 | 385 | 126 | 505 |
| CAN | 794 | 612 | 0 | 808 | 1779 | 1142 | 1285 | 1127 | 1551 | 1719 | 1284 | 3113 | 884 | 1122 | 1128 | 1068 | 155 | 427 | 174 | 873 |
| CHE | 400 | 511 | 702 | 0 | 860 | 569 | 555 | 543 | 693 | 701 | 799 | 879 | 366 | 527 | 372 | 479 | 77 | 343 | 100 | 437 |
| DEU | 432 | 696 | 742 | 633 | 0 | 1916 | 1329 | 1834 | 1637 | 2099 | 2227 | 2511 | 956 | 1561 | 1103 | 1500 | 211 | 522 | 264 | 897 |
| DFS | 497 | 575 | 831 | 513 | 942 | 0 | 959 | 1234 | 1331 | 1258 | 1590 | 1631 | 715 | 1123 | 783 | 1061 | 162 | 513 | 183 | 782 |
| ESP | 479 | 583 | 807 | 456 | 643 | 684 | 0 | 1015 | 1080 | 1258 | 1071 | 1511 | 706 | 917 | 830 | 871 | 134 | 408 | 156 | 761 |
| FRA | 445 | 651 | 692 | 466 | 645 | 597 | 708 | 0 | 1245 | 1347 | 1434 | 1787 | 742 | 1262 | 900 | 1074 | 141 | 458 | 155 | 716 |
| GBR | 735 | 720 | 1566 | 689 | 867 | 916 | 879 | 736 | 0 | 1490 | 1609 | 2061 | 777 | 1120 | 866 | 1022 | 154 | 688 | 177 | 839 |
| ITA | 540 | 661 | 1475 | 645 | 1125 | 983 | 930 | 717 | 1264 | 0 | 1494 | 2343 | 895 | 1316 | 962 | 1190 | 186 | 463 | 228 | 883 |
| NLD | 703 | 1060 | 1114 | 768 | 1308 | 1159 | 903 | 784 | 1322 | 1257 | 0 | 2053 | 778 | 1303 | 853 | 1341 | 191 | 621 | 203 | 876 |
| USA | 876 | 641 | 3119 | 808 | 976 | 1014 | 988 | 824 | 1884 | 1870 | 1505 | 0 | 1135 | 1569 | 1620 | 1533 | 203 | 541 | 196 | 1111 |
| HUN | 318 | 326 | 779 | 306 | 572 | 513 | 540 | 453 | 622 | 756 | 577 | 1027 | 0 | 735 | 588 | 823 | 116 | 318 | 127 | 578 |
| POL | 358 | 447 | 833 | 378 | 858 | 727 | 584 | 687 | 842 | 1003 | 991 | 1300 | 564 | 0 | 737 | 1083 | 182 | 391 | 205 | 776 |
| JPN | 277 | 224 | 387 | 212 | 266 | 299 | 302 | 251 | 337 | 350 | 319 | 445 | 233 | 238 | 0 | 726 | 108 | 310 | 113 | 548 |
| CZE | 339 | 388 | 728 | 348 | 897 | 612 | 597 | 612 | 721 | 880 | 1125 | 1143 | 695 | 741 | 218 | 0 | 144 | 384 | 182 | 704 |
| EST | 44 | 54 | 73 | 35 | 102 | 86 | 59 | 52 | 75 | 96 | 117 | 129 | 67 | 98 | 27 | 78 | 0 | 67 | 53 | 105 |
| IRL | 373 | 382 | 415 | 347 | 384 | 430 | 403 | 382 | 755 | 440 | 589 | 521 | 270 | 296 | 186 | 299 | 36 | 0 | 80 | 360 |
| SVN | 69 | 96 | 130 | 75 | 241 | 143 | 112 | 101 | 133 | 194 | 174 | 154 | 90 | 160 | 50 | 134 | 28 | 64 | 0 | 120 |
| PRT | 370 | 510 | 874 | 393 | 620 | 664 | 731 | 591 | 775 | 849 | 866 | 1129 | 556 | 714 | 256 | 579 | 65 | 322 | 95 | 0 |

HOL
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common bulls below diagonal
common three quarter sib group above diagonal

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        BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   CZE   IRL   KOR   SVN   PRT   EST   HUN   POL
      ---------------------------------------------------------------------------------------------------------------
BEL     0    596   421   662   606   531   648   664   561   817   679   428   360   167   106   418    63   296   335
CAN    592     0   696  1468  1046  1169  1098  1456  1529  1094  2925   919   411   428   145   731   107   727   705
CHE    423   596     0   668   478   462   477   591   595   613   736   374   282   171    85   343    55   279   306
DEU    589   679   490     0  1474  1111  1463  1296  1613  1752  1982  1165   412   326   198   674   148   713   925
DFS    559   828   425   841     0   867  1229  1319   995  1357  1624   854   510   262   150   643   111   529   663
ESP    530   738   360   534   635     0   961   976  1065   926  1379   744   370   314   132   629    94   545   581
FRA    633   690   402   564   597   683     0  1243  1053  1239  1786   919   457   296   129   611    97   595   834
GBR    684  1493   560   740   914   773   737     0  1247  1340  2052   850   683   307   150   695   107   584   681
ITA    577  1348   547   921   840   791   638  1094     0  1185  1936   958   378   388   181   695   134   722   823
NLD    889  1011   590  1123  1077   774   742  1128  1076     0  1573  1129   540   282   165   700   132   580   766
USA    621  3005   650   841  1013   851   824  1882  1661  1238     0  1295   540   507   167   913   129   878   944
CZE    330   641   265   734   519   492   504   596   735   996   966     0   308   293   152   570    95   631   673
IRL    368   412   273   318   430   361   382   749   374   519   521   237     0   109    66   294    43   226   231
KOR    130   412   133   180   198   217   177   229   338   203   592   207    82     0    74   254    46   262   280
SVN     83   112    65   183   122    98    87   121   159   143   132   116    54    49     0   105    39   107   149
PRT    417   718   301   506   542   576   494   611   676   686   909   467   258   224    81     0    63   420   465
EST     37    52    23    67    58    39    36    58    68    80    68    51    24    19    17    39     0    78   112
HUN    239   650   229   436   394   391   363   455   616   440   795   529   192   201    77   411    42     0   459
POL    256   532   210   477   438   345   426   516   622   549   724   431   186   196   119   424    53   362     0
      ---------------------------------------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
        BEL   CHE   DEU   DFS   FRA   GBR   ITA   NLD   USA   CZE   JPN   IRL   KOR   CAN   PRT   ESP   SVN   EST   HUN   NZL   POL
      ---------------------------------------------------------------------------------------------------------------------------
BEL     0    473   648   302   499   664   579   872   675   392   252   331   174   492   303   539   124    74   254   203   412
CHE    479     0   742   247   445   664   657   753   850   380   262   303   189   675   275   523   101    65   253   192   402
DEU    573   551     0   770  1255  1300  1749  1804  1991  1100   691   365   363  1317   544  1117   261   174   631   245  1193
DFS    241   201   321     0   423   626   531   788   686   437   220   276   132   322   263   416    85    61   225   194   420
FRA    470   375   519   173     0   833  1023   977  1186   723   541   282   296   822   421   781   149   111   499   185   941
GBR    682   651   743   352   548     0  1335  1492  2017   782   513   620   345  1153   499  1008   178   127   516   337   864
ITA    589   597   942   364   595  1147     0  1295  2099   984   695   377   441  1478   573  1140   220   156   680   231  1082
NLD    950   736  1151   503   631  1253  1136     0  1787  1089   503   531   311   953   511   979   205   157   508   425  1003
USA    607   778   843   343   599  1872  1741  1385     0  1200   917   495   581  2295   674  1436   197   157   791   336  1246
CZE    303   270   706   231   421   554   748   961   912     0   460   257   334   788   433   690   181   115   548   188   828
JPN    161   164   210   107   190   249   287   241   337   173     0   161   307   655   288   558   104    76   362   133   511
IRL    340   307   293   206   254   682   367   508   483   197   121     0   106   303   180   354    74    47   177   226   243
KOR    131   144   196    77   186   253   375   216   671   236   166    79     0   454   264   346    85    61   282   104   373
CAN    513   605   665   246   560  1238  1335   963  2579   595   302   326   439     0   521   982   172   120   627   209   864
PRT    301   238   405   194   368   439   552   484   699   355   171   160   227   525     0   462   114    76   332   142   519
ESP    546   425   526   273   560   825   835   836   929   444   224   357   233   679   409     0   155   109   492   227   705
SVN     94    75   243    58    99   133   191   175   154   134    49    58    54   130    88    50     0    50   122    53   197
EST     45    29    81    26    45    65    83   100    93    64    25    28    28    66    53    50    27     0    91    33   149
HUN    204   202   387   148   318   409   569   385   724   462   162   148   219   601   335   352    88    54     0   122   533
NZL    173   171   197   127   142   282   210   392   292   139    99   191    80   214   121   195    39    17    95     0   157
POL    329   286   682   254   552   683   846   793  1105   590   193   198   286   742   500   430   157    82   437   121     0
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JER
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common bulls below diagonal
common three quarter sib group above diagonal
       AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
     ----------------------------------------------------------------
AUS     0   147    87   101    44   149   249   131    17    14
CAN   152     0    90   132    48    74   428   142    13    21
DFS    64    78     0   104    57    89   148   121    21    33
GBR   100   136   100     0    51    76   163   110    16    33
ITA    43    46    56    51     0    36    64    57    14    17
NZL   150    75    68    78    32     0   147   101    16    17
USA   242   428   115   169    68   154     0   250    32    34
ZAF   135   142   104   108    57    98   257     0    26    24
NLD    13     8    15    13    11    13    33    21     0     4
CHE    12    19    32    31    18    15    34    24     3     0
     ----------------------------------------------------------------
JER
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   common bulls below diagonal
   common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  NZL  USA  ZAF  NLD  CHE
   --------------------------------------------------------------------------
   AUS    0  147   87  101   44  149  249  124   17   21
   CAN  152    0   90  132   48   74  428  131   13   26
   DFS   64   78    0  104   57   89  148  112   21   43
   GBR  100  136  100    0   51   76  163  105   16   40
   ITA   43   46   56   51    0   36   64   57   14   24
   NZL  150   75   68   78   32    0  147   92   16   23
   USA  242  428  115  169   68  154    0  230   32   41
   ZAF  129  133   98  104   57   90  239    0   26   36
   NLD   13    8   15   13   11   13   33   21    0    8
   CHE   19   25   42   39   25   21   42   36    6    0
   --------------------------------------------------------------------------

JER
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   common bulls below diagonal
   common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  NZL  ZAF  NLD  USA  CHE
   --------------------------------------------------------------------------
   AUS    0  147   87  101   44  149  124   17  249   25
   CAN  152    0   90  132   48   74  131   13  428   30
   DFS   64   78    0  104   57   89  112   21  148   46
   GBR  100  136  100    0   51   76  105   16  163   43
   ITA   43   46   56   51    0   36   57   14   64   27
   NZL  150   75   68   78   32    0   92   16  147   27
   ZAF  129  133   98  104   57   90    0   26  230   40
   NLD   13    8   15   13   11   13   21    0   32   10
   USA  242  428  115  169   68  154  239   33    0   45
   CHE   22   27   45   42   27   25   39    7   46    0
   --------------------------------------------------------------------------

JER
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   common bulls below diagonal
   common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  USA  ZAF  NLD  CHE
   --------------------------------------------------------------------------
   AUS    0  147   84  100   44  249  130    5   25
   CAN  152    0   90  132   48  428  142    5   30
   DFS   61   77    0  102   57  148  120   10   46
   GBR   99  136   98    0   51  163  110   10   43
   ITA   43   46   56   51    0   64   57    5   27
   USA  242  428  114  169   68    0  249   15   45
   ZAF  134  142  103  108   57  256    0   11   40
   NLD    2    3    9    8    4   14    9    0    5
   CHE   22   27   45   42   27   46   39    5    0
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JER
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   common bulls below diagonal
   common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  NZL  USA  ZAF  NLD  CHE
   --------------------------------------------------------------------------
   AUS    0  147   87  101   44  149  249  131   17   25
   CAN  152    0   90  132   48   74  428  142   13   30
   DFS   64   78    0  104   57   89  148  121   21   46
   GBR  100  136  100    0   51   76  163  110   16   43
   ITA   43   46   56   51    0   36   64   57   14   27
   NZL  150   75   68   78   32    0  147  101   16   27
   USA  242  428  115  169   68  154    0  250   32   45
   ZAF  135  142  104  108   57   98  257    0   26   40
   NLD   13    8   15   13   11   13   33   21    0   10
   CHE   22   27   45   42   27   25   46   39    7    0
   --------------------------------------------------------------------------

JER
--------
   common bulls below diagonal
   common three quarter sib group above diagonal
```

```
        AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
------------------------------------------------------------------------------
AUS      0   147    82   101    44   149   249   131    17    25
CAN    152     0    80   132    48    74   428   142    13    30
DFS     56    65     0   100    52    82   138   114    19    45
GBR    100   136    93     0    51    76   163   110    16    43
ITA     43    46    49    51     0    36    64    57    14    27
NZL    150    75    60    78    32     0   147   101    16    27
USA    242   428   103   169    68   154     0   250    32    45
ZAF    135   142    94   108    57    98   257     0    26    40
NLD     13     8    13    13    11    13    33    21     0    10
CHE     22    27    44    42    27    25    46    39     7     0
------------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
------------------------------------------------------------------------------
AUS      0   147    87   101    44   149   249   131    17    25
CAN    152     0    90   132    48    74   428   142    13    30
DFS     64    78     0   104    57    89   148   121    21    46
GBR    100   136   100     0    51    76   163   110    16    43
ITA     43    46    56    51     0    36    64    57    14    27
NZL    150    75    68    78    32     0   147   101    16    27
USA    242   428   115   169    68   154     0   250    32    45
ZAF    135   142   104   108    57    98   257     0    26    40
NLD     13     8    15    13    11    13    33    21     0    10
CHE     22    27    45    42    27    25    46    39     7     0
------------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DFS   ITA   ZAF   NLD   USA   CHE
------------------------------------------------------------------------------
AUS      0   147    79    44   103    17   249    25
CAN    152     0    80    48   117    13   428    30
DFS     54    65     0    52    84    19   138    45
ITA     43    46    49     0    51    14    64    27
ZAF    104   113    70    49     0    23   196    40
NLD     13     8    13    11    16     0    32    10
USA    242   428   103    68   193    33     0    45
CHE     22    27    44    27    39     7    46     0
------------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DFS   GBR   ITA   USA   ZAF   NLD   CHE
------------------------------------------------------------------------------
AUS      0   147    84   100    44   249   130    17    25
CAN    152     0    90   132    48   428   142    13    30
DFS     62    78     0   102    57   148   120    21    46
GBR     99   136    98     0    51   163   110    16    43
ITA     43    46    56    51     0    64    57    14    27
USA    242   428   115   169    68     0   249    32    45
ZAF    134   142   103   108    57   256     0    26    40
NLD     13     8    15    13    11    33    21     0    10
CHE     22    27    45    42    27    46    39     7     0
------------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
------------------------------------------------------------------------------
AUS      0   147    87   101    44   149   249   131    17    25
CAN    152     0    90   132    48    74   428   142    13    30
```

```
    DFS    64    78     0   104    57    89   148   121    21    46
    GBR   100   136   100     0    51    76   163   110    16    43
    ITA    43    46    56    51     0    36    64    57    14    27
    NZL   150    75    68    78    32     0   147   101    16    27
    USA   242   428   115   169    68   154     0   250    32    45
    ZAF   135   142   104   108    57    98   257     0    26    40
    NLD    13     8    15    13    11    13    33    21     0    10
    CHE    22    27    45    42    27    25    46    39     7     0
    -------------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
    -------------------------------------------------------------------------------
    AUS     0   147    79   101    44   149   249   131    17    25
    CAN   152     0    74   132    48    74   428   142    13    30
    DFS    54    63     0    91    52    75   131   109    19    45
    GBR   100   136    89     0    51    76   163   110    16    43
    ITA    43    46    49    51     0    36    64    57    14    27
    NZL   150    75    55    78    32     0   147   101    16    27
    USA   242   428    98   169    68   154     0   250    32    45
    ZAF   135   142    92   108    57    98   257     0    26    40
    NLD    13     8    13    13    11    13    33    21     0    10
    CHE    22    27    44    42    27    25    46    39     7     0
    -------------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
    -------------------------------------------------------------------------------
    AUS     0   147    87   101    44   149   249   131    17    25
    CAN   152     0    90   132    48    74   428   142    13    30
    DFS    64    78     0   104    57    89   148   121    21    46
    GBR   100   136   100     0    51    76   163   110    16    43
    ITA    43    46    56    51     0    36    64    57    14    27
    NZL   150    75    68    78    32     0   147   101    16    27
    USA   242   428   115   169    68   154     0   250    32    45
    ZAF   135   142   104   108    57    98   257     0    26    40
    NLD    13     8    15    13    11    13    33    21     0    10
    CHE    22    27    45    42    27    25    46    39     7     0
    -------------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   USA   ZAF   NLD   CHE
    -------------------------------------------------------------------------------
    AUS     0   147    85   100    44   249   131    17    25
    CAN   152     0    90   132    48   425   142    13    30
    DFS    63    78     0   102    57   148   121    21    46
    GBR    99   136    98     0    51   163   110    16    43
    ITA    43    46    56    51     0    64    57    14    27
    USA   242   426   115   169    68     0   249    32    45
    ZAF   135   142   104   108    57   256     0    26    40
    NLD    13     8    15    13    11    33    21     0    10
    CHE    22    27    45    42    27    46    39     7     0
    -------------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
    -------------------------------------------------------------------------------
    AUS     0   147    87   101    44   149   249   131    17    25
    CAN   152     0    90   132    48    74   428   142    13    30
    DFS    64    78     0   104    57    89   148   121    21    46
    GBR   100   136   100     0    51    76   163   110    16    43
```

```
 ITA   43   46   56   51    0   36   64   57   14   27
 NZL  150   75   68   78   32    0  147  101   16   27
 USA  242  428  115  169   68  154    0  250   32   45
 ZAF  135  142  104  108   57   98  257    0   26   40
 NLD   13    8   15   13   11   13   33   21    0   10
 CHE   22   27   45   42   27   25   46   39    7    0
 ------------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  USA  ZAF  NLD  CHE  NZL
 ------------------------------------------------------------------------------

 AUS    0  147   84  100   44  249  123   17   25   14
 CAN  152    0   90  132   48  428  131   13   30    9
 DFS   62   78    0  102   57  148  111   21   46   11
 GBR   99  136   98    0   51  163  105   16   43   10
 ITA   43   46   56   51    0   64   57   14   27    2
 USA  242  428  115  169   68    0  230   32   45   12
 ZAF  128  133   97  104   57  239    0   26   40   10
 NLD   13    8   15   13   11   33   21    0   10    1
 CHE   22   27   45   42   27   46   39    7    0    3
 NZL   14    9   10    9    1   12   10    0    3    0
 ------------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  NZL  ZAF  NLD  USA  CHE
 ------------------------------------------------------------------------------

 AUS    0  147   71  149  121   17  249   25
 CAN  152    0   69   74  128   13  428   30
 DFS   49   60    0   68   96   19  124   45
 NZL  150   75   50    0   88   16  147   27
 ZAF  124  127   80   82    0   26  225   40
 NLD   13    8   13   13   21    0   32   10
 USA  242  428   93  154  226   33    0   45
 CHE   22   27   44   25   39    7   46    0
 ------------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  NZL  USA  NLD  CHE
 ------------------------------------------------------------------------------

 AUS    0  147   87   35   44  149  249   17   21
 CAN  152    0   90   37   48   74  428   13   26
 DFS   64   78    0   32   57   89  148   21   43
 GBR   40   42   30    0   14   36   37    4    3
 ITA   43   46   56   15    0   36   64   14   24
 NZL  150   75   68   40   32    0  147   16   23
 USA  242  428  115   40   68  154    0   32   41
 NLD   13    8   15    5   11   13   33    0    8
 CHE   19   25   42    4   25   21   42    6    0
 ------------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  NZL  USA  NLD  CHE
 ------------------------------------------------------------------------------

 AUS    0  147   84  101  149  249   17   21
 CAN  152    0   84  132   74  424   13   26
 DFS   62   76    0   94   81  140   21   43
 GBR  100  136   95    0   73  163   16   40
 NZL  150   75   62   75    0  147   16   23
 USA  242  425  109  169  154    0   32   41
 NLD   13    8   15   13   13   33    0    8
 CHE   19   25   42   39   21   42    6    0
```

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      --------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  USA  NLD  CHE
      --------------------------------------------------------------------------
  AUS    0  124   74   83   40  212   15   19
  CAN  129    0   90  132   48  427   13   26
  DFS   53   78    0  102   57  147   21   43
  GBR   81  136   98    0   51  163   16   40
  ITA   38   46   56   51    0   64   14   24
  USA  201  427  114  169   68    0   32   41
  NLD   11    8   15   13   11   33    0    8
  CHE   17   25   42   39   25   42    6    0
      --------------------------------------------------------------------------
JER
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JER
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RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM  LVA
      --------------------------------------------------------------------------
  AUS    0   23    9   43    9   13   21   13    8    3   15
  CAN   23    0    7  137   67    4   32  146    3    0   10
  DEU    9    7    0   31    1    8    5    1    9    0   24
  DFS   32  138   21    0   50   82   54   78   33    0  118
  GBR    8   66    1   46    0    0   25   53    1    0    3
  NOR    9    4    7   61    0    0    6    0   22    0   11
  NZL   20   30    5   52   22    5    0   20    2    2    6
  USA   13  140    1   74   49    0   19    0    2    0    4
  NLD    8    3    8   32    1   21    2    2    0    0   12
  CAM    3    0    0    0    0    0    2    0    0    0    0
  LVA   14   10   19   80    3    9    6    4   11    0    0
      --------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NZL  USA  NLD  CAM  NOR  LVA
      --------------------------------------------------------------------------
  AUS    0   23    9   43    9   21   13    8    3    7   14
  CAN   23    0    7  137   67   32  146    3    0    1   10
  DEU    9    7    0   31    1    5    1    9    0    3   23
  DFS   32  138   21    0   50   52   78   31    0   48   99
  GBR    8   66    1   46    0   25   53    1    0    0    3
  NZL   20   30    5   50   22    0   20    2    2    3    5
  USA   13  140    1   74   49   19    0    2    0    0    4
  NLD    8    3    8   30    1    2    2    0    0   12   11
  CAM    3    0    0    0    0    2    0    0    0    0    0
  NOR    6    1    2   34    0    3    0   11    0    0    1
  LVA   13   10   18   65    3    5    4   10    0    0    0
      --------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM  LVA
      --------------------------------------------------------------------------
  AUS    0   23    9   43    9    6   21   13    8    3   15
  CAN   23    0    7  137   67    1   32  144    3    0   10
  DEU    9    7    0   31    1    3    5    1    9    0   24
  DFS   32  138   21    0   50   58   52   78   31    0  118
  GBR    8   66    1   46    0    0   25   52    1    0    3
  NOR    5    1    2   41    0    0    3    0   17    0    2
  NZL   20   30    5   50   22    3    0   20    2    2    6
```

```
 USA   13   139    1   74   48    0   19    0    2    0    4
 NLD    8     3    8   30    1   16    2    2    0    0   12
 CAM    3     0    0    0    0    0    2    0    0    0    0
 LVA   14    10   19   80    3    1    6    4   11    0    0
       ---------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  USA  NLD  CAM  NOR  LVA
       ---------------------------------------------------------------------------
 AUS     0    23    9   43    9   13    8    3    7   15
 CAN    23     0    7  137   67  146    3    0    3   10
 DEU     9     7    0   31    1    1    9    0    3   24
 DFS    32   138   21    0   50   78   30    0   54  118
 GBR     8    66    1   46    0   53    1    0    0    3
 USA    13   140    1   74   49    0    2    0    0    4
 NLD     8     3    8   29    1    2    0    0   12   11
 CAM     3     0    0    0    0    0    0    0    0    0
 NOR     6     2    2   41    0    0   11    0    0    1
 LVA    14    10   19   80    3    4   10    0    0    0
       ---------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM  LVA
       ---------------------------------------------------------------------------
 AUS     0    23    9   43    9   15   21   13    8    3   15
 CAN    23     0    7  137   67    4   32  146    3    0   10
 DEU     9     7    0   31    1    8    5    1    9    0   24
 DFS    32   138   21    0   50   92   51   78   32    0  118
 GBR     8    66    1   46    0    0   25   53    1    0    3
 NOR    11     4    7   69    0    0    7    0   22    0   12
 NZL    20    30    5   47   22    6    0   20    2    2    6
 USA    13   140    1   74   49    0   19    0    2    0    4
 NLD     8     3    8   31    1   21    2    2    0    0   12
 CAM     3     0    0    0    0    0    2    0    0    0    0
 LVA    14    10   19   80    3   10    6    4   11    0    0
       ---------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NZL  USA  NLD  CAM  NOR  LVA
       ---------------------------------------------------------------------------
 AUS     0    23    9   43    9   21   13    8    3    6   15
 CAN    23     0    7  137   67   32  146    3    0    1   10
 DEU     9     7    0   31    1    5    1    9    0    3   24
 DFS    32   138   21    0   50   52   78   32    0   46  118
 GBR     8    66    1   46    0   25   53    1    0    0    3
 NZL    20    30    5   50   22    0   20    2    2    3    6
 USA    13   140    1   74   49   19    0    2    0    0    4
 NLD     8     3    8   31    1    2    2    0    0   12   12
 CAM     3     0    0    0    0    2    0    0    0    0    0
 NOR     5     1    2   32    0    3    0   11    0    0    1
 LVA    14    10   19   80    3    6    4   11    0    0    0
       ---------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM  LVA
       ---------------------------------------------------------------------------
 AUS     0    23    9   43    9   15   21   13    8    3   15
 CAN    23     0    7  137   67    4   32  146    3    0   10
 DEU     9     7    0   31    1    8    5    1    9    0   24
 DFS    32   138   21    0   50   95   54   78   33    0  118
 GBR     8    66    1   46    0    0   25   53    1    0    3
```

```
 NOR    11     4     7    71     0     0     7     0    22     0    12
 NZL    20    30     5    52    22     6     0    20     2     2     6
 USA    13   140     1    74    49     0    19     0     2     0     4
 NLD     8     3     8    32     1    21     2     2     0     0    12
 CAM     3     0     0     0     0     0     2     0     0     0     0
 LVA    14    10    19    80     3    10     6     4    11     0     0
---------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  NOR  NLD  USA  CAM  LVA
---------------------------------------------------------------------

 AUS     0    23     9    43    15     8    13     3    14
 CAN    23     0     7   136     4     3   146     0    10
 DEU     9     7     0    31     8     9     1     0    23
 DFS    32   137    21     0    92    30    78     0    99
 NOR    11     4     7    69     0    22     0     0    10
 NLD     8     3     8    29    21     0     2     0    11
 USA    13   140     1    74     0     2     0     0     4
 CAM     3     0     0     0     0     0     0     0     0
 LVA    13    10    18    65     8    10     4     0     0
---------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  USA  NLD  CAM  LVA
---------------------------------------------------------------------

 AUS     0    23     6    43     9    15    13     8     3    15
 CAN    23     0     5   137    67     4   146     3     0    10
 DEU     6     5     0    23     1     7     1     9     0    12
 DFS    32   138    16     0    50    92    78    31     0   118
 GBR     8    66     1    46     0     0    53     1     0     3
 NOR    11     4     6    69     0     0    22     0    12
 USA    13   140     1    74    49     0     2     0     4
 NLD     8     3     8    30     1    21     2     0     0    12
 CAM     3     0     0     0     0     0     0     0     0     0
 LVA    14    10    10    80     3    10     4    11     0     0
---------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM  LVA
---------------------------------------------------------------------
 AUS     0    23     9    43     9    15    21    13     8     3    15
 CAN    23     0     7   137    67     4    32   146     3     0    10
 DEU     9     7     0    31     1     8     5     1     9     0    24
 DFS    32   138    21     0    50    95    54    78    31     0   118
 GBR     8    66     1    46     0     0    25    53     1     0     3
 NOR    11     4     7    71     0     0     7     0    22     0    12
 NZL    20    30     5    52    22     6     0    20     2     2     6
 USA    13   140     1    74    49     0    19     0     2     0     4
 NLD     8     3     8    30     1    21     2     2     0     0    12
 CAM     3     0     0     0     0     0     2     0     0     0     0
 LVA    14    10    19    80     3    10     6     4    11     0     0
---------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM  LVA
---------------------------------------------------------------------

 AUS     0    23     9    43     9    15    21    13     8     3    15
 CAN    23     0     7   137    67     4    32   146     3     0    10
 DEU     9     7     0    31     1     8     5     1     9     0    24
 DFS    32   138    21     0    50    92    52    78    31     0   112
 GBR     8    66     1    46     0     0    25    53     1     0     3
```

```
  NOR   11    4    7   69    0    0    7    0   22    0   12
  NZL   20   30    5   49   22    6    0   20    2    2    6
  USA   13  140    1   74   49    0   19    0    2    0    4
  NLD    8    3    8   30    1   21    2    2    0    0   12
  CAM    3    0    0    0    0    0    2    0    0    0    0
  LVA   14   10   19   76    3   10    6    4   11    0    0
  ----------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM  LVA
  ----------------------------------------------------------------------------
  AUS    0   23    9   43    9   15   21   13    8    3   15
  CAN   23    0    7  137   67    4   32  146    3    0   10
  DEU    9    7    0   31    1    9    5    1    9    0   24
  DFS   32  138   21    0   50   87   54   78   33    0  118
  GBR    8   66    1   46    0    0   25   53    1    0    3
  NOR   11    4    8   66    0    0    7    0   22    0   12
  NZL   20   30    5   52   22    6    0   20    2    2    6
  USA   13  140    1   74   49    0   19    0    2    2    6
  NLD    8    3    8   32    1   21    2    2    0    0   12
  CAM    3    0    0    0    0    0    2    0    0    0    0
  LVA   14   10   19   80    3   10    6    4   11    0    0
  ----------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DEU  DFS  GBR  NOR  USA  NLD  CAM  LVA
  ----------------------------------------------------------------------------
  AUS    0   23    9   43    9   15   13    8    3   15
  CAN   23    0    7  137   67    4  143    3    0   10
  DEU    9    7    0   31    1    8    1    9    0   24
  DFS   32  138   21    0   50   95   78   33    0  118
  GBR    8   66    1   46    0    0   53    1    0    3
  NOR   11    4    7   71    0    0    0   22    0   12
  USA   13  139    1   74   49    0    0    2    0    4
  NLD    8    3    8   32    1   21    2    0    0   12
  CAM    3    0    0    0    0    0    0    0    0    0
  LVA   14   10   19   80    3   10    4   11    0    0
  ----------------------------------------------------------------------------
RDC
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 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM  LVA
  ----------------------------------------------------------------------------
  AUS    0   23    9   43    9   15   21   13    8    3   14
  CAN   23    0    7  137   67    4   32  146    3    0   10
  DEU    9    7    0   31    1    9    5    1    9    0   23
  DFS   32  138   21    0   50   94   52   78   32    0   99
  GBR    8   66    1   46    0    0   25   53    1    0    3
  NOR   11    4    8   71    0    0    7    0   22    0   11
  NZL   20   30    5   50   22    6    0   20    2    2    5
  USA   13  140    1   74   49    0   19    0    2    0    4
  NLD    8    3    8   31    1   21    2    2    0    0   11
  CAM    3    0    0    0    0    0    2    0    0    0    0
  LVA   13   10   18   65    3    9    5    4   10    0    0
  ----------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DEU  DFS  GBR  NOR  USA  NLD  CAM  LVA  NZL
  ----------------------------------------------------------------------------
  AUS    0   23    9   43    9   15   13    8    3   15    2
  CAN   23    0    7  137   67    4  144    3    0   10    1
  DEU    9    7    0   31    1    8    1    9    0   24    1
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    DFS    32   138    21     0    50    89    78    33     0   118     4
    GBR     8    66     1    46     0     0    52     1     0     3     2
    NOR    11     4     7    66     0     0     0    22     0    12     1
    USA    13   139     1    74    48     0     0     2     0     4     1
    NLD     8     3     8    32     1    21     2     0     0    12     0
    CAM     3     0     0     0     0     0     0     0     0     0     0
    LVA    14    10    19    80     3    10     4    11     0     0     0
    NZL     2     1     1     4     2     1     1     0     0     0     0
    ----------------------------------------------------------------------
RDC
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  NOR  NZL  NLD  USA  CAM  LVA
    ----------------------------------------------------------------------
    AUS     0    23     9    38    15    21     8    13     3    15
    CAN    23     0     7   131     4    32     3   146     0    10
    DEU     9     7     0    28     9     5     9     1     0    24
    DFS    29   131    21     0    86    47    30    73     0   101
    NOR    11     4     8    66     0     7    22     0     0    12
    NZL    20    30     5    46     6     0     1    20     2     6
    NLD     8     3     8    29    21     1     0     2     0    11
    USA    13   140     1    70     0    19     2     0     0     4
    CAM     3     0     0     0     0     2     0     0     0     0
    LVA    14    10    19    68    10     6    10     4     0     0
    ----------------------------------------------------------------------
RDC
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM
    ----------------------------------------------------------------------
    AUS     0    23     9    43     8    17    21    13     8     3
    CAN    23     0     7   137    64     6    32   146     3     0
    DEU     9     7     0    31     1    10     5     1     9     0
    DFS    32   138    21     0    50   109    54    78    33     0
    GBR     7    63     1    46     0     0    22    51     1     0
    NOR    13     5     9    86     0     0     8     0    23     0
    NZL    20    30     5    52    19     7     0    20     2     2
    USA    13   140     1    74    47     0    19     0     2     0
    NLD     8     3     8    32     1    22     2     2     0     0
    CAM     3     0     0     0     0     0     2     0     0     0
    ----------------------------------------------------------------------
RDC
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM
    ----------------------------------------------------------------------
    AUS     0    23     9    43     8    15    21    13     8     3
    CAN    23     0     7   137    64     4    32   143     3     0
    DEU     9     7     0    31     1     8     5     1     9     0
    DFS    32   138    21     0    50    95    54    78    33     0
    GBR     7    63     1    46     0     0    22    51     1     0
    NOR    11     4     7    71     0     0     7     0    22     0
    NZL    20    30     5    52    19     6     0    20     2     2
    USA    13   139     1    74    47     0    19     0     2     0
    NLD     8     3     8    32     1    21     2     2     0     0
    CAM     3     0     0     0     0     0     2     0     0     0
    ----------------------------------------------------------------------
RDC
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  USA  NLD  CAM
    ----------------------------------------------------------------------
    AUS     0    23     9    43     8    15    13     8     3
    CAN    23     0     7   137    64     4   146     3     0
    DEU     9     7     0    32     1     8     1     9     0
```

```
   DFS     32    138     22      0     50     95     78     33      0
   GBR      7     63      1     46      0      0     51      1      0
   NOR     11      4      7     71      0      0      0     22      0
   USA     13    140      1     74     47      0      0      2      0
   NLD      8      3      8     32      1     21      2      0      0
   CAM      3      0      0      0      0      0      0      0      0
   -------------------------------------------------------------------
RDC
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