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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

For a full list of trait definitions applied by countries please refer to the file confdoc_DEFINITION{runid}.itb
Changes in national procedures
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Changes in the national genetic evaluation of conformation traits are as
follows:

KOR (HOL)       Correction in some animals' information causing some animals to no longer be submitted
JPN (HOL)       Some changes in proofs caused by additional records and in EDCs caused by modification of pedigree
FRA (ALL)       Base change, for HOL several missing bulls in current submission: Those bulls donâ\200\231t appear among the publication file received by the partner in charge of proofs publication.
                Bulls affected concern Â« old Â» bulls, 98% of them being born before 1995. Moreover, pedigree updates have also been carried out.
AUS (ALL)       Drops in information due to data clean-up such as pedigree changes, status change of a bull which leads to a good number of bulls no longer being qualifying. JER: Used to participate
                with very old data to OFL, now removed from the evaluation
CAN (ALL)       Base change
CHE (ALL)       Base change. BSW: Manual edits in the database due cause some drops in information. Made some modifications in the pedigree-based (PBLUP) evaluation to make it in line
                to the Single step evaluation: Applied the software package MiX99 for the ebv/rel estimation and the mtedc software for the edc calculation. Further, the pedigrees
                used for these evaluations were expanded to include all the genotyped animals. STATURE: in 2008 the trait used for stature was changed from height at withers
                to height at sacrum. Until now, counts for stature contained both, data for height at withers and height at sacrum. For the ebv/rel estimation we use a multi-trait
                model with both traits included. We now changed the counting of number of daughters and number of herds so that only height at sacrum is counted.
                Also for the edc calculation, only records with height at sacrum are included. Therefore, counts for number of daughters, number of herds and edc decrease
                for most older bulls
DEU (ALL)       Base change
DEA (BSW)       Some drops in information due to ongoing pedigree corrections based on results from ongoing genotyping of females in our populations.
SVN (HOL, BSW)  Base change
USA (HOL)       Base change, small drops in information due to parentage verification
EST (HOL)       Base change, Drop in information for conformation trait LOC due to exclusion of one 'assistant*year' data as considered not reliable of the new assistant
ITA (HOL, JER)  Base change, for HOL drim of one year of phenotypic data.
DFS (ALL)       Change in trait definition for ANG from angularity to rib structure. Data scored before 1.1.2020 deleated. Due to the fact that ANG is included in
                OCS for HOL and JER, OCS has also changed for these breeds.
POL (HOL)       New organisation, CGen, replacing NIAP. New model and estimated new genetic parameters as part of a single step evaluation. New base change to be aligned with production traits.
                Only bulls with a minimum number of 10 herds were submitted. A new data editing pipeline has been implemented including stricter filters on herd size, contemporary group size, outliers
                identification, and the cows' breed causing a reduction in the number of daughters and herds for almost all the bulls in the evaluation. Applied the mtedc software for EDC calculation
                Changed Type Of Proof from 12 to 11 due to a new procedure for setting type of proof: The previous procedure counted daughters based on milk yield and used this information to set
                the bulls type of proof for all traits. Currently, the Type Of Proof is based on each trait-specific daughter count. Pedigree clean-up and verification.
                Some animals appear to be missing in this evaluation because they were either identified as duplicate of another animal during predigree clean-up or
                dropped in the numbers of daugters or herds below publication criteria or there were breed incosistency of bulls which actually were not HOL
NLD (ALL)       Base change, drops in information for udder conformation traits due to data edits.
USA (OTH)       Base change, transitioned from a single-trait reliability calculation to a multi-trait reliability calculation
ITA (BSW)       base change, Overall conformation traits: changes in editing procedure and classification of fixed factors causing decrease in information
PRT (HOL)       Base change, new variance components and new heritabilities, drops in EDC due to changes in pedigree
NZL (ALL)       Some drops in information, especially EDC, added a filter for which if a daughters breed didn't match a bulls breed the daughter got dropped from a bulls proof, this has affected the
                national herd because of the number of cross bred animals present.
LVA (HOL, RDC)  New legal organisation called Rural Support Service, LAD, replacing LDC
HUN (HOL)       Changes in the type of proof for some bulls makes them no longer meeting the minimum requirements for inclusion.



INTERBULL CHANGES COMPARED TO THE PREVIOUS ROUTINE RUN
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A new document called confdoc_DEFINITION{runid}.itb has been introduced reporting all the trait definitions applied by countries as reported in the PREP.

During 2023-2024, Interbull Centre and the Interbull Technical Committee (ITC) have worked on developing a new procedures for adjusting of the international correlations after a given test run in case
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countries would decide NOT TO implement the changes tested in the next routine run.
Until now, the relative difference between the previous routineâ\200\231s and test runâ\200\231s correlations, for each pair of countries, was assessed and the average value of the two was used whenever such difference did exceed a threshold of 0.01. Otherwise, correlations from the latest test run were used.
However, in some cases, the difference in correlations between routine/test runs were way above a 1% difference so that by using the average value the newly derived correlations would still be greatly affected by the changes tested but not implemented. This remark has been made in few occasions by some participating countries.
A new approach proposed by Peter Sullivan, was developed and extensively tested. The new approach is based on first identifying the relative impact of the changes tested by a country during the test run (but not implemented in a routine run) and then correcting the whole correlation matrix detracting such estimated impact.
This new approach would assure that the new correlations would be free from any effect from any changes tested but not implemented.
The new procedure has been fully developed during 2023 and extensively tested during 2024 and introduced officially in the April 2025 routine evaluation.

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

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

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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
------------------------------------------------------------------------------------
Dates for the next test run can be found on
http://www.interbull.org/ib/servicecalendar.

From this year an extra MACE test run has been scheduled in May, data submissions' deadline and
target for distribution of results are all reported in the above link.

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 2025).
Number of records for stature by breed
------------------------------------------------------------------------------------
Country      BSW        GUE        HOL        JER        RDC        SIM
------------------------------------------------------------------------------------
AUS                      50        4069        783        267
BEL                                1775
CAN          256        107       13061        880        923
CHE         1643                   3230         54
CZE                                4600
DEA         3868
DEU                               21955                   289
DFS                               12540       2149       6534
ESP                                4636
EST                                 975
FRA          453                  16315
FRM
GBR           26        237        6692        482        356
HUN                                2701
IRL                                1989
ISR
ITA         2306                   8595         74
JPN                                6495
KOR                                1713
LTU
LVA                                1512                   623
NLD          152                  15802         59         61
NOR                                                      2599
NZL                                7301       4407        613
POL                                9689
PRT                                2729
SVK
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SVN            271                 663
URY
USA            978        743      34694        4672          290
ZAF                                851          563
HRV
CAM                                                           40
==================================================================================
No.Records     9953       1137     184582       14123         12595
Pub. Proofs    8986       961      142215       12208         13138          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      6.29
CHE      0.95   12.80
FRA      0.98   0.97   0.93
ITA      0.96   0.95   0.95   13.81
NLD      0.94   0.95   0.96   0.91   4.35
USA      0.98   0.95   0.97   0.95   0.93   1.85
DEA      0.96   0.98   0.98   0.95   0.95   0.96   11.15
SVN      0.93   0.92   0.91   0.94   0.90   0.91   0.91   16.93
GBR      0.96   0.92   0.96   0.93   0.93   0.96   0.90   0.90   0.84


----------------------------------------------------------------------------------
BSW    cwi
----------------------------------------------------------------------------------
         CAN    CHE    FRA    ITA    NLD    USA    DEA    SVN    GBR
CAN      7.57
CHE      0.90   9.71
FRA      0.87   0.91   0.82
ITA      0.80   0.84   0.85   21.14
NLD      0.92   0.84   0.89   0.70   4.71
USA      0.88   0.88   0.91   0.86   0.84   1.08
DEA      0.86   0.81   0.86   0.72   0.74   0.79   11.33
SVN      0.89   0.91   0.91   0.82   0.85   0.85   0.90   24.61
GBR      0.91   0.84   0.81   0.69   0.90   0.80   0.82   0.82   1.49


----------------------------------------------------------------------------------
BSW    bde
----------------------------------------------------------------------------------
         CAN    CHE    FRA    ITA    NLD    DEA    SVN    GBR    USA
CAN      7.07
CHE      0.83   10.17
FRA      0.72   0.87   0.90
ITA      0.79   0.91   0.90   17.80
NLD      0.80   0.85   0.84   0.84   4.71
DEA      0.80   0.89   0.91   0.87   0.78   11.00
SVN      0.78   0.73   0.78   0.78   0.78   0.70   25.05
GBR      0.87   0.88   0.78   0.83   0.89   0.86   0.84   1.74
USA      0.73   0.75   0.84   0.77   0.85   0.81   0.78   0.86   1.00


----------------------------------------------------------------------------------
BSW    ang
----------------------------------------------------------------------------------
         CAN    CHE    FRA    NLD    USA    GBR
CAN      8.72
CHE      0.69   10.76
FRA      0.86   0.67   0.83
NLD      0.79   0.69   0.67   3.83
USA      0.85   0.68   0.74   0.78   1.22
GBR      0.88   0.77   0.78   0.82   0.90   0.73


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BSW    ran
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```
----------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      7.20
CHE      0.94   10.54
FRA      0.97    0.96    0.91
ITA      0.93    0.93    0.93   23.17
NLD      0.95    0.91    0.95    0.91    4.65
USA      0.97    0.93    0.96    0.91    0.94    1.58
DEA      0.97    0.94    0.96    0.94    0.91    0.97   11.77
SVN      0.91    0.88    0.89    0.89    0.90    0.90    0.88   22.63
GBR      0.96    0.93    0.97    0.93    0.96    0.96    0.91    0.92    1.95

----------------------------------------------------------------------
BSW    rwi
----------------------------------------------------------------------
          CAN     CHE     FRA     NLD     USA     DEA     GBR     SVN     ITA
CAN      7.23
CHE      0.89   10.16
FRA      0.95    0.87    0.97
NLD      0.93    0.85    0.93    4.14
USA      0.91    0.86    0.86    0.80    1.01
DEA      0.90    0.88    0.92    0.77    0.89   13.22
GBR      0.92    0.84    0.90    0.87    0.92    0.81    1.18
SVN      0.89    0.79    0.93    0.85    0.81    0.88    0.86   25.68
ITA      0.87    0.79    0.90    0.78    0.87    0.87    0.86    0.90   19.15

----------------------------------------------------------------------
BSW    rls
----------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      7.80
CHE      0.92   12.72
FRA      0.92    0.93    0.97
ITA      0.91    0.86    0.92   23.70
NLD      0.87    0.85    0.88    0.83    5.06
USA      0.95    0.90    0.90    0.86    0.85    1.05
DEA      0.91    0.91    0.93    0.89    0.79    0.89   12.13
SVN      0.86    0.80    0.88    0.83    0.80    0.86    0.87   22.47
GBR      0.85    0.85    0.90    0.83    0.86    0.82    0.86    0.79    1.50

----------------------------------------------------------------------
BSW    fan
----------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      8.69
CHE      0.68   13.77
FRA      0.74    0.74    1.04
ITA      0.69    0.84    0.81   21.28
NLD      0.71    0.67    0.81    0.69    5.10
USA      0.81    0.73    0.81    0.86    0.80    0.96
DEA      0.62    0.87    0.68    0.88    0.63    0.63   11.54
SVN      0.69    0.76    0.72    0.77    0.67    0.75    0.78   24.64
GBR      0.79    0.72    0.84    0.72    0.87    0.82    0.68    0.75    1.26

----------------------------------------------------------------------
BSW    hde
----------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     DEA     SVN     USA
CAN      8.14
CHE      0.84   11.97
FRA      0.79    0.82    1.07
ITA      0.79    0.83    0.82   20.83
NLD      0.74    0.73    0.80    0.71    5.10
DEA      0.75    0.87    0.85    0.93    0.75   11.91
SVN      0.80    0.86    0.86    0.88    0.74    0.90   31.63
USA      0.83    0.72    0.80    0.89    0.79    0.81    0.80    0.96

----------------------------------------------------------------------
BSW    fua
```

```
-------------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      6.60
CHE      0.86   12.18
FRA      0.89    0.88    0.84
ITA      0.88    0.85    0.86   19.20
NLD      0.90    0.85    0.87    0.87    4.75
USA      0.93    0.85    0.86    0.92    0.88    1.53
DEA      0.81    0.84    0.90    0.82    0.76    0.82   11.01
SVN      0.72    0.71    0.78    0.80    0.77    0.72    0.88   21.57
GBR      0.91    0.83    0.87    0.87    0.91    0.90    0.70    0.58    1.48

-------------------------------------------------------------------------------------
BSW    ruh
-------------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      7.54
CHE      0.91   11.93
FRA      0.85    0.82    0.89
ITA      0.75    0.84    0.86   12.89
NLD      0.76    0.81    0.88    0.83    4.28
USA      0.82    0.79    0.88    0.84    0.90    1.15
DEA      0.84    0.84    0.91    0.92    0.81    0.80   11.66
SVN      0.79    0.78    0.81    0.85    0.87    0.80    0.87   20.91
GBR      0.72    0.78    0.86    0.80    0.88    0.90    0.75    0.77    1.76

-------------------------------------------------------------------------------------
BSW    ruw
-------------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN
CAN      8.57
CHE      0.91   11.76
FRA      0.84    0.88    0.82
ITA      0.78    0.88    0.79   13.27
NLD      0.70    0.67    0.80    0.68    4.28
USA      0.86    0.90    0.87    0.88    0.81    1.09
DEA      0.84    0.90    0.77    0.95    0.55    0.90   12.07
SVN      0.82    0.83    0.79    0.82    0.65    0.82    0.84   21.25

-------------------------------------------------------------------------------------
BSW    usu
-------------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      7.75
CHE      0.91   11.78
FRA      0.84    0.91    0.87
ITA      0.88    0.91    0.88   19.08
NLD      0.82    0.83    0.89    0.81    4.26
USA      0.83    0.89    0.86    0.85    0.91    1.25
DEA      0.92    0.93    0.90    0.92    0.77    0.84   11.34
SVN      0.82    0.81    0.69    0.76    0.65    0.73    0.82   20.41
GBR      0.78    0.79    0.84    0.83    0.92    0.92    0.72    0.62    2.66

-------------------------------------------------------------------------------------
BSW    ude
-------------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      6.69
CHE      0.95   12.06
FRA      0.95    0.96    0.98
ITA      0.95    0.96    0.97   19.74
NLD      0.95    0.94    0.95    0.94    4.40
USA      0.96    0.95    0.96    0.95    0.95    1.42
DEA      0.93    0.97    0.95    0.97    0.94    0.92   12.18
SVN      0.92    0.94    0.92    0.95    0.95    0.92    0.95   22.71
GBR      0.96    0.93    0.96    0.94    0.96    0.95    0.90    0.94    2.16

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BSW    ftp
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--------------------------------------------------------------------------------
          CAN     CHE     FRA     NLD     USA     DEA     SVN     GBR     ITA
CAN      7.39
CHE      0.97   13.93
FRA      0.97    0.96    0.89
NLD      0.97    0.95    0.96    5.46
USA      0.91    0.89    0.87    0.92    1.40
DEA      0.95    0.98    0.95    0.95    0.90   10.97
SVN      0.93    0.93    0.93    0.96    0.90    0.96   18.29
GBR      0.94    0.92    0.89    0.94    0.94    0.92    0.93    1.38
ITA      0.87    0.86    0.86    0.87    0.86    0.86    0.87    0.87   21.06

--------------------------------------------------------------------------------
BSW    ftl
--------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      6.59
CHE      0.90   14.57
FRA      0.95    0.95    0.97
ITA      0.93    0.94    0.95   18.08
NLD      0.92    0.96    0.92    0.92    5.05
USA      0.93    0.96    0.96    0.94    0.96    1.98
DEA      0.90    0.98    0.98    0.95    0.94    0.96   11.00
SVN      0.90    0.91    0.90    0.90    0.92    0.91    0.91   18.69
GBR      0.95    0.94    0.93    0.94    0.97    0.97    0.92    0.92    1.53

--------------------------------------------------------------------------------
BSW    rtp
--------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     DEA     SVN     USA
CAN      6.93
CHE      0.98   14.43
FRA      0.97    0.98    0.88
ITA      0.92    0.95    0.94   19.91
NLD      0.96    0.95    0.96    0.92    5.04
DEA      0.96    0.99    0.97    0.96    0.94   11.92
SVN      0.93    0.93    0.94    0.92    0.95    0.93   18.30
USA      0.95    0.94    0.94    0.92    0.96    0.95    0.93    1.47

--------------------------------------------------------------------------------
BSW    ocs
--------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      7.80
CHE      0.78    8.96
FRA      0.73    0.82    0.97
ITA      0.66    0.78    0.83    7.01
NLD      0.73    0.69    0.77    0.70    3.88
USA      0.80    0.69    0.78    0.67    0.83    0.56
DEA      0.78    0.89    0.85    0.76    0.59    0.64   10.37
SVN      0.59    0.65    0.64    0.59    0.60    0.61    0.75   19.53
GBR      0.74    0.82    0.84    0.77    0.86    0.85    0.66    0.69    1.76

--------------------------------------------------------------------------------
BSW    ous
--------------------------------------------------------------------------------
          CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN      8.03
CHE      0.82   13.64
FRA      0.88    0.86    0.96
ITA      0.82    0.88    0.87    7.85
NLD      0.89    0.84    0.89    0.81    5.13
USA      0.89    0.77    0.80    0.79    0.88    0.90
DEA      0.83    0.93    0.82    0.89    0.79    0.76   12.37
SVN      0.75    0.80    0.71    0.77    0.79    0.73    0.89   19.42
GBR      0.77    0.82    0.74    0.80    0.78    0.85    0.74    0.72    1.59

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BSW    ofl
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-------------------------------------------------------------------------------
          CAN      CHE      FRA      ITA      NLD      USA      DEA      SVN      GBR
CAN      8.47
CHE      0.81    11.07
FRA      0.63     0.63     1.67
ITA      0.58     0.63     0.66    11.77
NLD      0.64     0.65     0.73     0.62     4.25
USA      0.59     0.61     0.65     0.67     0.66     0.89
DEA      0.63     0.81     0.63     0.58     0.58     0.57    11.00
SVN      0.71     0.83     0.62     0.60     0.63     0.64     0.87    26.53
GBR      0.66     0.75     0.81     0.67     0.72     0.71     0.65     0.62     1.46

-------------------------------------------------------------------------------
BSW     ofr
-------------------------------------------------------------------------------
          CAN      CHE      DEA      ITA      SVN      USA      FRA
CAN      7.20
CHE      0.80    11.36
DEA      0.80     0.89    11.35
ITA      0.75     0.91     0.90    15.97
SVN      0.73     0.79     0.79     0.82    23.02
USA      0.75     0.80     0.89     0.84     0.78     1.85
FRA      0.73     0.90     0.91     0.90     0.81     0.88     0.85

-------------------------------------------------------------------------------
BSW     tpl
-------------------------------------------------------------------------------
          CAN      CHE      DEA      ITA      SVN      FRA
CAN      7.27
CHE      0.87    12.06
DEA      0.88     0.89    11.78
ITA      0.91     0.91     0.89    23.60
SVN      0.88     0.86     0.84     0.86    24.44
FRA      0.96     0.92     0.92     0.90     0.87     1.26

-------------------------------------------------------------------------------
BSW     oru
-------------------------------------------------------------------------------
          CAN      CHE      DEA      ITA      SVN      USA      FRA
CAN      7.67
CHE      0.75    15.79
DEA      0.73     0.87    12.44
ITA      0.80     0.76     0.72    13.57
SVN      0.82     0.57     0.71     0.79    26.56
USA      0.89     0.57     0.49     0.75     0.66     1.01
FRA      0.82     0.86     0.80     0.90     0.69     0.83     1.24

-------------------------------------------------------------------------------
BSW     rle
-------------------------------------------------------------------------------
          CHE      DEA      ITA      SVN      USA      FRA
CHE     11.61
DEA      0.94    12.17
ITA      0.82     0.85    19.20
SVN      0.78     0.76     0.82    24.47
USA      0.55     0.50     0.77     0.71     1.01
FRA      0.93     0.94     0.86     0.78     0.73     1.03

-------------------------------------------------------------------------------
BSW     thp
-------------------------------------------------------------------------------
          CAN      CHE      DEA      ITA      SVN      USA      FRA
CAN      7.42
CHE      0.84    10.81
DEA      0.79     0.81    11.94
ITA      0.87     0.90     0.85    29.87
SVN      0.76     0.85     0.85     0.87    35.02
USA      0.89     0.86     0.71     0.82     0.73     1.58
FRA      0.88     0.81     0.85     0.83     0.76     0.78     0.97
```

```
------------------------------------------------------------------------------------
BSW    hoq
------------------------------------------------------------------------------------
          CAN     CHE     DEA     ITA     SVN     FRA
CAN      7.10
CHE      0.91   12.06
DEA      0.92    0.89   12.59
ITA      0.91    0.85    0.85   19.41
SVN      0.94    0.89    0.91    0.91   21.74
FRA      0.91    0.85    0.88    0.87    0.89    1.01

------------------------------------------------------------------------------------
BSW    ful
------------------------------------------------------------------------------------
          CHE     DEA     ITA     SVN     FRA
CHE     11.62
DEA      0.91   12.10
ITA      0.92    0.95   12.79
SVN      0.82    0.91    0.84   21.15
FRA      0.76    0.85    0.78    0.75    0.87

------------------------------------------------------------------------------------
BSW    udb
------------------------------------------------------------------------------------
          CHE     DEA     ITA     SVN     FRA
CHE     12.08
DEA      0.96   13.28
ITA      0.93    0.95   26.33
SVN      0.83    0.85    0.84   24.20
FRA      0.92    0.88    0.86    0.81    0.90

------------------------------------------------------------------------------------
BSW    tdi
------------------------------------------------------------------------------------
          CHE     DEA     ITA     SVN     FRA
CHE     15.66
DEA      0.96   11.30
ITA      0.94    0.95   20.40
SVN      0.90    0.92    0.91   18.92
FRA      0.97    0.97    0.91    0.91    0.86

------------------------------------------------------------------------------------
BSW    tth
------------------------------------------------------------------------------------
          CHE     DEA     ITA     SVN     FRA
CHE     14.36
DEA      0.98   12.88
ITA      0.94    0.95   23.07
SVN      0.88    0.87    0.88   20.86
FRA      0.93    0.95    0.95    0.87    0.90

------------------------------------------------------------------------------------
GUE    sta
------------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN      6.76
GBR      0.97    1.22
USA      0.98    0.96    2.78
AUS      0.90    0.92    0.91    0.88

------------------------------------------------------------------------------------
GUE    cwi
------------------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN      6.78
GBR      0.92    1.87
USA      0.85    0.84    1.61
AUS      0.72    0.80    0.64    0.32
```

```
--------------------------------------------------------------------------------
GUE    bde
--------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        6.39
GBR        0.88    1.58
USA        0.75    0.88    1.73
AUS        0.80    0.77    0.69    0.44

--------------------------------------------------------------------------------
GUE    ang
--------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        7.93
GBR        0.89    1.67
USA        0.87    0.91    1.99
AUS        0.66    0.76    0.66    0.38

--------------------------------------------------------------------------------
GUE    ran
--------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        6.47
GBR        0.97    1.70
USA        0.97    0.97    2.33
AUS        0.90    0.92    0.88    0.73

--------------------------------------------------------------------------------
GUE    rwi
--------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        7.06
GBR        0.93    1.63
USA        0.92    0.91    1.89
AUS        0.84    0.83    0.77    0.65

--------------------------------------------------------------------------------
GUE    rls
--------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        8.54
GBR        0.82    1.86
USA        0.93    0.80    1.07
AUS        0.70    0.78    0.71    0.31

--------------------------------------------------------------------------------
GUE    rlr
--------------------------------------------------------------------------------
            CAN     USA     AUS
CAN        7.33
USA        0.84    0.95
AUS        0.59    0.54    0.17

--------------------------------------------------------------------------------
GUE    fan
--------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        8.96
GBR        0.78    1.76
USA        0.84    0.75    1.01
AUS        0.62    0.75    0.63    0.26

--------------------------------------------------------------------------------
GUE    fua
--------------------------------------------------------------------------------
            CAN     GBR     USA     AUS
CAN        7.25
GBR        0.94    1.44
```

```
USA        0.92    0.92    2.21
AUS        0.78    0.77    0.75    0.37


----------------------------------------------------------------------------------------
GUE    ruh
----------------------------------------------------------------------------------------

           CAN     GBR     USA     AUS
CAN        6.95
GBR        0.72    2.03
USA        0.80    0.91    1.84
AUS        0.75    0.76    0.75    0.38


----------------------------------------------------------------------------------------
GUE    usu
----------------------------------------------------------------------------------------

           CAN     GBR     USA     AUS
CAN        6.95
GBR        0.78    1.63
USA        0.79    0.87    1.57
AUS        0.74    0.78    0.75    0.30


----------------------------------------------------------------------------------------
GUE    ude
----------------------------------------------------------------------------------------

           CAN     GBR     USA     AUS
CAN        6.35
GBR        0.97    1.46
USA        0.95    0.94    2.26
AUS        0.89    0.89    0.87    0.51


----------------------------------------------------------------------------------------
GUE    ftp
----------------------------------------------------------------------------------------

           CAN     GBR     USA     AUS
CAN        5.83
GBR        0.95    1.28
USA        0.92    0.92    1.91
AUS        0.92    0.91    0.86    0.40


----------------------------------------------------------------------------------------
GUE    ftl
----------------------------------------------------------------------------------------

           CAN     GBR     USA     AUS
CAN        4.86
GBR        0.94    1.95
USA        0.94    0.97    2.08
AUS        0.93    0.94    0.93    0.92


----------------------------------------------------------------------------------------
GUE    rtp
----------------------------------------------------------------------------------------

           CAN     AUS     USA
CAN        5.41
AUS        0.88    0.34
USA        0.93    0.88    1.91


----------------------------------------------------------------------------------------
GUE    ocs
----------------------------------------------------------------------------------------

           CAN     GBR     USA     AUS
CAN        7.96
GBR        0.76    2.19
USA        0.74    0.86    0.91
AUS        0.58    0.64    0.57    0.79


----------------------------------------------------------------------------------------
GUE    ous
----------------------------------------------------------------------------------------

           CAN     GBR     USA     AUS
```

```
CAN      8.08
GBR      0.78   1.62
USA      0.87   0.83   1.01
AUS      0.69   0.81   0.73   1.05

-------------------------------------------------------------------------------
GUE    ofl
-------------------------------------------------------------------------------
         CAN    GBR    USA    AUS
CAN      7.41
GBR      0.66   1.67
USA      0.64   0.67   0.97
AUS      0.40   0.55   0.53   0.58

-------------------------------------------------------------------------------
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      0.63
BEL      0.88   1.04
CAN      0.89   0.93   5.00
CHE      0.89   0.91   0.96   10.76
DEU      0.88   0.91   0.98   0.97   12.84
DFS      0.87   0.93   0.96   0.96   0.97   10.71
ESP      0.89   0.92   0.98   0.97   0.98   0.97   0.71
FRA      0.89   0.94   0.98   0.98   0.97   0.97   0.98   1.04
GBR      0.92   0.92   0.97   0.95   0.96   0.94   0.96   0.97   1.06
ITA      0.87   0.87   0.95   0.93   0.94   0.93   0.95   0.95   0.95   1.14
NLD      0.86   0.91   0.95   0.97   0.98   0.97   0.96   0.97   0.94   0.92   4.16
USA      0.90   0.91   0.98   0.94   0.96   0.95   0.96   0.96   0.97   0.94   0.93   1.18
HUN      0.87   0.91   0.96   0.93   0.96   0.93   0.96   0.96   0.95   0.93   0.93   0.94   0.91
POL      0.86   0.89   0.95   0.94   0.96   0.94   0.96   0.96   0.94   0.93   0.95   0.93   0.94   12.65
NZL      0.89   0.85   0.83   0.84   0.83   0.83   0.83   0.86   0.89   0.83   0.83   0.86   0.85   0.83   0.43
ZAF      0.90   0.91   0.91   0.89   0.89   0.87   0.89   0.91   0.93   0.85   0.85   0.90   0.89   0.87   0.89   0.72
JPN      0.89   0.94   0.98   0.96   0.97   0.97   0.98   0.99   0.96   0.94   0.96   0.97   0.96   0.96   0.86   0.90   1.20
CZE      0.87   0.94   0.97   0.94   0.97   0.94   0.96   0.96   0.95   0.92   0.94   0.94   0.96   0.95   0.85   0.92   0.96   12.92
EST      0.86   0.90   0.95   0.94   0.95   0.95   0.94   0.96   0.93   0.94   0.96   0.91   0.94   0.94   0.84   0.88   0.95   0.95   15.25
IRL      0.88   0.88   0.93   0.91   0.91   0.88   0.92   0.93   0.97   0.92   0.89   0.93   0.92   0.90   0.89   0.90   0.92   0.93   0.89   0.71
KOR      0.83   0.84   0.85   0.84   0.85   0.83   0.83   0.84   0.86   0.83   0.83   0.83   0.85   0.83   0.83   0.83   0.84   0.87   0.84   0.83   4.36
SVN      0.87   0.90   0.95   0.95   0.97   0.96   0.96   0.95   0.92   0.93   0.96   0.93   0.91   0.95   0.83   0.84   0.95   0.94   0.93   0.88   0.84   14.80
PRT      0.86   0.90   0.94   0.92   0.95   0.93   0.93   0.94   0.94   0.91   0.91   0.92   0.93   0.92   0.83   0.87   0.94   0.94   0.91   0.90   0.83   0.91   1.12
LVA      0.83   0.83   0.83   0.83   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   0.83   0.83   0.84   0.83   0.40

-------------------------------------------------------------------------------
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      0.68   1.67
CAN      0.73   0.84   6.12
CHE      0.66   0.84   0.90   10.92
DEU      0.69   0.88   0.91   0.85   12.32
DFS      0.72   0.87   0.92   0.84   0.94   12.64
ESP      0.68   0.87   0.91   0.86   0.82   0.86   1.05
FRA      0.63   0.90   0.84   0.92   0.86   0.82   0.85   1.05
GBR      0.82   0.85   0.92   0.85   0.90   0.90   0.85   0.81   1.43
ITA      0.63   0.77   0.72   0.78   0.68   0.64   0.79   0.87   0.67   1.28
NLD      0.71   0.87   0.92   0.89   0.94   0.91   0.85   0.88   0.91   0.70   5.10
USA      0.63   0.82   0.83   0.86   0.81   0.79   0.84   0.92   0.79   0.91   0.81   1.23
HUN      0.63   0.83   0.87   0.84   0.85   0.85   0.84   0.88   0.79   0.81   0.83   0.89   1.11
POL      0.63   0.89   0.87   0.87   0.89   0.87   0.87   0.87   0.89   0.82   0.88   0.88   0.87   16.07
NZL      0.77   0.65   0.70   0.67   0.67   0.69   0.70   0.64   0.78   0.63   0.68   0.68   0.63   0.65   0.39
ZAF      0.67   0.88   0.83   0.85   0.85   0.85   0.85   0.86   0.89   0.69   0.85   0.86   0.84   0.86   0.70   0.83
JPN      0.63   0.83   0.75   0.82   0.73   0.72   0.81   0.91   0.67   0.91   0.72   0.92   0.84   0.81   0.63   0.76   1.54
CZE      0.69   0.91   0.91   0.85   0.92   0.91   0.90   0.86   0.88   0.78   0.89   0.85   0.88   0.92   0.69   0.87   0.80   14.07
EST      0.73   0.78   0.86   0.76   0.80   0.84   0.83   0.73   0.81   0.63   0.85   0.64   0.68   0.78   0.67   0.72   0.64   0.81   21.97
IRL      0.80   0.77   0.83   0.78   0.85   0.82   0.73   0.75   0.93   0.63   0.83   0.72   0.73   0.73   0.81   0.82   0.63   0.81   0.76   1.30
KOR      0.63   0.72   0.63   0.63   0.71   0.71   0.69   0.70   0.65   0.66   0.64   0.72   0.74   0.65   0.66   0.68   0.71   0.76   0.63   0.63   2.41
SVN      0.68   0.84   0.87   0.80   0.91   0.92   0.84   0.82   0.82   0.69   0.88   0.79   0.87   0.83   0.64   0.79   0.72   0.86   0.76   0.74   0.67   23.25
```

PRT	0.64	0.81	0.82	0.78	0.86	0.83	0.81	0.82	0.81	0.74	0.84	0.82	0.86	0.86	0.63	0.77	0.77	0.85	0.64	0.74	0.69	0.79	2.01	
LVA	0.64	0.67	0.64	0.71	0.65	0.66	0.63	0.68	0.64	0.63	0.65	0.63	0.63	0.63	0.64	0.63	0.64	0.64	0.65	0.64	0.63	0.66	0.64	0.40

HOL   bde

	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	0.68	1.37																						
CAN	0.83	0.78	5.58																					
CHE	0.74	0.89	0.89	11.33																				
DEU	0.73	0.92	0.88	0.91	11.50																			
DFS	0.80	0.86	0.92	0.88	0.94	11.78																		
ESP	0.75	0.90	0.90	0.92	0.91	0.90	1.02																	
FRA	0.68	0.88	0.68	0.82	0.81	0.70	0.81	0.96																
GBR	0.78	0.90	0.88	0.91	0.92	0.91	0.92	0.77	1.30															
ITA	0.68	0.87	0.70	0.83	0.86	0.78	0.84	0.88	0.84	1.24														
NLD	0.68	0.87	0.82	0.90	0.91	0.85	0.90	0.85	0.91	0.88	4.78													
USA	0.68	0.91	0.74	0.88	0.90	0.81	0.88	0.88	0.87	0.91	0.90	1.13												
HUN	0.69	0.88	0.84	0.89	0.90	0.87	0.92	0.78	0.89	0.83	0.85	0.88	1.04											
POL	0.75	0.83	0.83	0.83	0.92	0.90	0.85	0.70	0.87	0.81	0.84	0.81	0.85	15.81										
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	0.73	0.39									
ZAF	0.73	0.88	0.83	0.83	0.87	0.86	0.88	0.71	0.91	0.72	0.82	0.84	0.85	0.86	0.70	0.87								
JPN	0.68	0.93	0.76	0.90	0.92	0.84	0.89	0.91	0.87	0.89	0.90	0.94	0.88	0.81	0.68	0.80	1.37							
CZE	0.79	0.83	0.93	0.85	0.93	0.93	0.89	0.68	0.91	0.78	0.84	0.81	0.89	0.91	0.70	0.86	0.80	15.39						
EST	0.78	0.82	0.93	0.89	0.90	0.92	0.89	0.70	0.89	0.76	0.85	0.82	0.87	0.87	0.66	0.81	0.82	0.91	18.08					
IRL	0.81	0.84	0.85	0.87	0.88	0.89	0.87	0.72	0.93	0.78	0.83	0.81	0.82	0.83	0.75	0.86	0.80	0.87	0.81	1.17				
KOR	0.68	0.82	0.72	0.80	0.83	0.83	0.79	0.74	0.75	0.68	0.72	0.76	0.80	0.71	0.68	0.74	0.82	0.77	0.75	0.74	3.09			
PRT	0.75	0.81	0.81	0.81	0.90	0.87	0.84	0.68	0.87	0.78	0.79	0.80	0.87	0.87	0.72	0.82	0.82	0.88	0.80	0.85	0.71	1.94		
SVN	0.73	0.90	0.85	0.89	0.90	0.89	0.92	0.83	0.89	0.83	0.91	0.87	0.85	0.81	0.66	0.81	0.88	0.85	0.86	0.86	0.78	0.75	19.30	
LVA	0.70	0.70	0.78	0.77	0.78	0.80	0.72	0.67	0.77	0.68	0.71	0.68	0.78	0.75	0.68	0.69	0.69	0.81	0.74	0.78	0.70	0.77	0.68	0.34

HOL   ang

	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	1.10																					
CAN	0.66	0.74	6.49																				
CHE	0.60	0.76	0.86	11.22																			
DEU	0.61	0.61	0.60	0.61	9.20																		
DFS	0.70	0.76	0.80	0.81	0.60	8.89																	
ESP	0.63	0.75	0.84	0.78	0.60	0.80	0.64																
FRA	0.60	0.81	0.86	0.85	0.60	0.72	0.80	0.87															
GBR	0.78	0.75	0.90	0.79	0.61	0.83	0.80	0.79	1.46														
ITA	0.67	0.73	0.87	0.81	0.60	0.83	0.88	0.79	0.82	1.30													
NLD	0.71	0.62	0.82	0.77	0.60	0.78	0.78	0.69	0.83	0.80	4.52												
USA	0.67	0.76	0.92	0.81	0.60	0.86	0.81	0.81	0.90	0.82	0.76	1.35											
HUN	0.60	0.71	0.77	0.72	0.61	0.78	0.71	0.77	0.73	0.73	0.60	0.81	1.02										
POL	0.60	0.74	0.71	0.71	0.60	0.81	0.81	0.68	0.69	0.85	0.71	0.70	0.61	12.10									
ZAF	0.63	0.80	0.71	0.69	0.63	0.74	0.68	0.72	0.84	0.71	0.61	0.77	0.77	0.65	0.72								
JPN	0.67	0.80	0.90	0.81	0.61	0.87	0.87	0.83	0.86	0.89	0.79	0.87	0.78	0.80	0.78	1.42							
CZE	0.68	0.76	0.81	0.75	0.61	0.83	0.74	0.74	0.77	0.76	0.63	0.77	0.83	0.68	0.68	0.80	13.85						
EST	0.62	0.70	0.61	0.63	0.62	0.62	0.61	0.65	0.62	0.61	0.61	0.61	0.71	0.61	0.76	0.70	0.67	23.30					
IRL	0.74	0.71	0.85	0.72	0.61	0.79	0.78	0.78	0.91	0.79	0.70	0.85	0.72	0.66	0.79	0.84	0.76	0.63	0.71				
KOR	0.68	0.78	0.78	0.73	0.61	0.68	0.77	0.74	0.80	0.74	0.65	0.78	0.78	0.70	0.75	0.83	0.73	0.67	0.76	2.15			
PRT	0.60	0.69	0.76	0.66	0.61	0.75	0.74	0.70	0.77	0.75	0.60	0.81	0.73	0.69	0.69	0.80	0.72	0.62	0.72	0.76	1.13		
SVN	0.63	0.62	0.66	0.64	0.61	0.64	0.69	0.62	0.64	0.70	0.61	0.61	0.62	0.84	0.62	0.63	0.61	0.63	0.62	0.74	0.61	18.37	
LVA	0.61	0.61	0.60	0.61	0.61	0.63	0.60	0.61	0.61	0.60	0.61	0.60	0.61	0.60	0.62	0.61	0.61	0.62	0.61	0.61	0.60	0.62	0.33

HOL   ran

	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	0.93	1.45																						
CAN	0.90	0.97	6.16																					
CHE	0.92	0.96	0.96	11.26																				
DEU	0.91	0.97	0.98	0.95	12.17																			

```
DFS   0.91  0.98  0.97  0.96  0.98 11.53
ESP   0.90  0.97  0.97  0.97  0.97  0.96  1.14
FRA   0.94  0.98  0.96  0.97  0.97  0.96  0.97  1.03
GBR   0.93  0.96  0.97  0.95  0.97  0.95  0.95  0.98  1.40
ITA   0.87  0.94  0.95  0.92  0.95  0.93  0.95  0.95  0.94  1.45
NLD   0.90  0.96  0.97  0.95  0.98  0.96  0.96  0.97  0.94  5.02
USA   0.89  0.95  0.97  0.94  0.96  0.96  0.95  0.96  0.97  0.93  0.96  1.43
HUN   0.90  0.96  0.95  0.95  0.97  0.95  0.97  0.97  0.95  0.95  0.95  0.94  1.05
POL   0.87  0.94  0.94  0.93  0.94  0.94  0.94  0.93  0.91  0.93  0.92  0.90  0.94 14.51
NZL   0.93  0.89  0.88  0.89  0.88  0.87  0.87  0.93  0.93  0.87  0.88  0.89  0.89  0.87  0.34
ZAF   0.94  0.94  0.91  0.91  0.91  0.92  0.92  0.94  0.93  0.87  0.92  0.91  0.93  0.87  0.89  0.88
JPN   0.87  0.95  0.97  0.95  0.96  0.96  0.96  0.94  0.92  0.93  0.95  0.94  0.94  0.94  0.87  0.87  1.44
CZE   0.87  0.95  0.97  0.92  0.98  0.96  0.95  0.94  0.96  0.95  0.96  0.97  0.95  0.93  0.87  0.90  0.93 14.48
EST   0.87  0.91  0.94  0.89  0.94  0.94  0.93  0.90  0.91  0.91  0.94  0.92  0.90  0.93  0.84  0.87  0.93  0.93 18.86
IRL   0.91  0.91  0.92  0.92  0.93  0.90  0.90  0.94  0.98  0.91  0.93  0.93  0.90  0.87  0.93  0.89  0.87  0.91  0.86  1.83
KOR   0.87  0.89  0.88  0.88  0.87  0.88  0.90  0.88  0.87  0.87  0.87  0.87  0.88  0.87  0.87  0.87  0.89  0.87  0.86  0.87  4.66
SVN   0.89  0.96  0.96  0.94  0.95  0.96  0.96  0.95  0.93  0.94  0.95  0.93  0.93  0.94  0.86  0.87  0.95  0.92  0.90  0.89  0.89 18.18
PRT   0.87  0.91  0.92  0.90  0.94  0.91  0.93  0.93  0.93  0.92  0.93  0.93  0.92  0.89  0.87  0.87  0.90  0.93  0.87  0.89  0.87  0.91  1.74
LVA   0.87  0.93  0.92  0.90  0.93  0.93  0.92  0.91  0.90  0.89  0.91  0.89  0.91  0.89  0.86  0.87  0.94  0.90  0.88  0.89  0.87  0.90  0.87  0.45
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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    0.53
BEL    0.83  1.45
CAN    0.86  0.94  5.57
CHE    0.84  0.95  0.92 11.08
DEU    0.78  0.93  0.95  0.90 11.33
DFS    0.81  0.90  0.94  0.88  0.96 12.35
ESP    0.88  0.92  0.97  0.90  0.94  0.94  0.97
FRA    0.84  0.95  0.96  0.93  0.94  0.93  0.95  1.07
GBR    0.84  0.90  0.94  0.85  0.89  0.90  0.91  0.91  1.30
ITA    0.76  0.82  0.87  0.78  0.84  0.83  0.87  0.87  0.87  1.35
NLD    0.83  0.94  0.94  0.93  0.96  0.92  0.94  0.94  0.88  0.78  4.86
USA    0.76  0.83  0.91  0.79  0.85  0.87  0.88  0.87  0.94  0.89  0.81  1.25
HUN    0.77  0.91  0.93  0.85  0.94  0.92  0.91  0.92  0.90  0.90  0.90  0.89  1.01
POL    0.79  0.90  0.93  0.88  0.91  0.90  0.91  0.91  0.89  0.90  0.89  0.85  0.93 15.24
NZL    0.83  0.84  0.87  0.79  0.81  0.79  0.86  0.85  0.87  0.82  0.82  0.83  0.83  0.77  0.31
ZAF    0.76  0.81  0.85  0.76  0.84  0.85  0.80  0.80  0.91  0.80  0.79  0.87  0.86  0.82  0.79  0.89
JPN    0.79  0.95  0.96  0.93  0.95  0.93  0.93  0.96  0.92  0.89  0.93  0.89  0.94  0.93  0.84  0.84  1.33
CZE    0.79  0.92  0.94  0.87  0.95  0.93  0.94  0.91  0.89  0.87  0.92  0.88  0.93  0.91  0.84  0.83  0.93 14.83
EST    0.79  0.90  0.90  0.91  0.91  0.87  0.90  0.87  0.83  0.79  0.92  0.77  0.88  0.90  0.78  0.76  0.87  0.90 15.76
IRL    0.76  0.76  0.79  0.76  0.78  0.77  0.76  0.77  0.87  0.76  0.76  0.85  0.77  0.76  0.79  0.78  0.78  0.78  0.76  1.58
KOR    0.76  0.84  0.81  0.80  0.80  0.78  0.78  0.82  0.76  0.76  0.79  0.76  0.83  0.77  0.76  0.76  0.82  0.78  0.77  0.76  3.16
PRT    0.76  0.84  0.88  0.79  0.89  0.89  0.87  0.85  0.84  0.83  0.81  0.85  0.88  0.85  0.76  0.82  0.85  0.87  0.77  0.76  0.76  1.61
SVN    0.80  0.90  0.93  0.91  0.94  0.93  0.93  0.91  0.88  0.81  0.94  0.83  0.90  0.92  0.77  0.80  0.93  0.94  0.89  0.77  0.77  0.85 19.89
LVA    0.76  0.80  0.78  0.76  0.81  0.84  0.78  0.77  0.77  0.77  0.77  0.76  0.80  0.78  0.76  0.77  0.77  0.81  0.79  0.76  0.76  0.76  0.80  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   PRT   SVN   LVA
AUS    0.31
BEL    0.77  1.81
CAN    0.69  0.95  5.85
CHE    0.76  0.91  0.94 11.80
DEU    0.71  0.94  0.95  0.93 11.92
DFS    0.67  0.94  0.97  0.91  0.97 13.39
ESP    0.72  0.95  0.95  0.91  0.96  0.95  1.15
FRA    0.77  0.91  0.89  0.90  0.90  0.88  0.91  1.00
GBR    0.78  0.86  0.84  0.84  0.85  0.82  0.83  0.90  1.40
ITA    0.65  0.91  0.89  0.85  0.89  0.90  0.89  0.88  0.81  1.41
NLD    0.71  0.90  0.92  0.92  0.94  0.92  0.92  0.89  0.86  0.85  5.26
USA    0.67  0.95  0.96  0.89  0.93  0.96  0.95  0.88  0.82  0.88  0.90  1.60
HUN    0.74  0.92  0.91  0.86  0.93  0.92  0.93  0.89  0.82  0.88  0.86  0.91  1.04
POL    0.71  0.93  0.94  0.89  0.95  0.93  0.94  0.92  0.84  0.89  0.88  0.92  0.95 19.67
NZL    0.65  0.65  0.65  0.65  0.65  0.65  0.65  0.65  0.68  0.65  0.65  0.65  0.66  0.66  0.14
ZAF    0.80  0.80  0.77  0.76  0.74  0.69  0.77  0.82  0.86  0.66  0.74  0.76  0.76  0.80  0.65  0.84
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JPN    0.65  0.91  0.97  0.89  0.94  0.97  0.94  0.87  0.80  0.89  0.88  0.94  0.90  0.95  0.65  0.69  1.75
CZE    0.68  0.91  0.92  0.84  0.93  0.92  0.90  0.87  0.85  0.86  0.89  0.90  0.93  0.95  0.65  0.76  0.91  15.47
EST    0.74  0.84  0.82  0.81  0.87  0.87  0.86  0.79  0.71  0.78  0.85  0.82  0.82  0.83  0.67  0.65  0.83  0.78  20.11
IRL    0.78  0.79  0.73  0.77  0.74  0.71  0.72  0.81  0.91  0.73  0.77  0.71  0.71  0.73  0.66  0.77  0.70  0.73  0.66  1.58
KOR    0.65  0.81  0.83  0.79  0.82  0.85  0.85  0.81  0.74  0.78  0.81  0.82  0.83  0.81  0.66  0.66  0.85  0.78  0.71  0.66  2.20
SVN    0.67  0.89  0.92  0.87  0.92  0.93  0.87  0.86  0.78  0.88  0.88  0.88  0.87  0.86  0.67  0.66  0.89  0.87  0.80  0.68  0.81  22.70
PRT    0.65  0.87  0.84  0.78  0.84  0.86  0.86  0.83  0.76  0.84  0.80  0.84  0.86  0.84  0.65  0.65  0.83  0.80  0.70  0.66  0.79  0.79  2.26
LVA    0.66  0.72  0.76  0.78  0.79  0.77  0.75  0.76  0.72  0.70  0.80  0.71  0.75  0.76  0.66  0.66  0.77  0.77  0.71  0.66  0.74  0.79  0.72  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	0.25																						
BEL	0.64	1.79																					
CAN	0.60	0.84	6.67																				
CHE	0.69	0.86	0.76	12.38																			
DEU	0.60	0.92	0.89	0.76	11.28																		
DFS	0.56	0.89	0.91	0.75	0.94	13.19																	
ESP	0.58	0.87	0.88	0.73	0.88	0.90	1.05																
FRA	0.70	0.92	0.84	0.86	0.87	0.84	0.88	1.01															
GBR	0.48	0.62	0.68	0.53	0.64	0.61	0.68	0.62	1.51														
ITA	0.58	0.79	0.81	0.65	0.77	0.74	0.81	0.82	0.64	1.81													
NLD	0.57	0.87	0.88	0.71	0.91	0.90	0.84	0.83	0.63	0.74	4.41												
USA	0.53	0.78	0.87	0.62	0.78	0.83	0.80	0.77	0.64	0.87	0.81	1.72											
HUN	0.64	0.84	0.77	0.77	0.79	0.79	0.77	0.82	0.53	0.75	0.74	0.80	1.12										
POL	0.49	0.83	0.86	0.72	0.81	0.83	0.79	0.84	0.53	0.82	0.76	0.81	0.76	21.96									
ZAF	0.58	0.71	0.55	0.60	0.54	0.55	0.49	0.62	0.49	0.61	0.50	0.69	0.65	0.65	0.73								
JPN	0.59	0.83	0.89	0.78	0.84	0.92	0.81	0.82	0.48	0.72	0.83	0.78	0.75	0.79	0.57	1.99							
CZE	0.57	0.84	0.80	0.72	0.84	0.81	0.76	0.80	0.56	0.78	0.77	0.79	0.77	0.83	0.67	0.74	16.90						
EST	0.54	0.72	0.66	0.63	0.76	0.81	0.65	0.67	0.49	0.49	0.77	0.57	0.61	0.67	0.51	0.79	0.59	18.64					
IRL	0.49	0.52	0.56	0.49	0.48	0.49	0.58	0.56	0.72	0.65	0.54	0.54	0.49	0.51	0.49	0.49	0.50	0.50	1.65				
KOR	0.53	0.73	0.71	0.64	0.70	0.73	0.75	0.75	0.49	0.68	0.64	0.68	0.66	0.71	0.53	0.70	0.69	0.58	0.49	1.90			
SVN	0.52	0.86	0.81	0.74	0.81	0.84	0.77	0.85	0.50	0.74	0.82	0.78	0.83	0.81	0.53	0.81	0.67	0.69	0.49	0.65	24.81		
PRT	0.54	0.83	0.74	0.69	0.83	0.76	0.77	0.81	0.57	0.72	0.76	0.69	0.73	0.78	0.50	0.68	0.78	0.69	0.48	0.65	0.80	2.32	
LVA	0.52	0.70	0.68	0.66	0.69	0.74	0.69	0.68	0.50	0.67	0.69	0.64	0.64	0.69	0.50	0.68	0.67	0.61	0.49	0.59	0.67	0.66	0.31

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	0.65	2.02																					
CAN	0.60	0.82	7.38																				
CHE	0.62	0.84	0.81	12.12																			
DEU	0.67	0.87	0.82	0.77	12.56																		
DFS	0.60	0.92	0.87	0.80	0.87	13.13																	
ESP	0.64	0.74	0.84	0.68	0.85	0.80	1.00																
FRA	0.71	0.73	0.71	0.67	0.85	0.68	0.80	0.87															
GBR	0.73	0.80	0.81	0.73	0.91	0.78	0.83	0.86	1.43														
ITA	0.60	0.67	0.78	0.72	0.76	0.71	0.75	0.67	0.73	1.62													
NLD	0.66	0.77	0.73	0.71	0.90	0.78	0.77	0.80	0.87	0.70	5.13												
USA	0.63	0.74	0.87	0.72	0.83	0.80	0.84	0.74	0.82	0.86	0.79	1.54											
HUN	0.75	0.75	0.78	0.77	0.86	0.75	0.83	0.86	0.85	0.70	0.77	0.79	1.14										
POL	0.60	0.74	0.83	0.77	0.77	0.77	0.81	0.72	0.76	0.86	0.70	0.87	0.80	18.43									
ZAF	0.81	0.75	0.75	0.72	0.81	0.73	0.75	0.77	0.86	0.68	0.72	0.79	0.86	0.69	0.90								
JPN	0.72	0.76	0.74	0.83	0.82	0.76	0.76	0.74	0.76	0.69	0.78	0.77	0.84	0.78	0.74	2.10							
CZE	0.68	0.84	0.85	0.79	0.92	0.84	0.83	0.83	0.85	0.75	0.80	0.83	0.92	0.78	0.79	0.86	15.65						
EST	0.73	0.72	0.70	0.72	0.80	0.78	0.79	0.77	0.75	0.61	0.78	0.71	0.79	0.64	0.69	0.88	0.85	22.94					
IRL	0.67	0.67	0.72	0.63	0.80	0.66	0.72	0.73	0.90	0.67	0.73	0.70	0.71	0.67	0.71	0.60	0.72	0.64	1.58				
KOR	0.61	0.61	0.67	0.61	0.67	0.61	0.73	0.60	0.65	0.60	0.61	0.67	0.68	0.62	0.61	0.60	0.68	0.64	0.61	1.43			
SVN	0.60	0.72	0.77	0.62	0.88	0.80	0.79	0.70	0.76	0.70	0.70	0.77	0.76	0.71	0.69	0.71	0.86	0.72	0.77	0.62	24.64		
PRT	0.60	0.60	0.60	0.60	0.72	0.60	0.70	0.67	0.61	0.62	0.65	0.70	0.62	0.60	0.61	0.62	0.66	0.67	0.60	0.67	0.69	1.99	
LVA	0.61	0.66	0.61	0.61	0.63	0.67	0.61	0.66	0.62	0.60	0.63	0.63	0.68	0.60	0.61	0.60	0.72	0.71	0.61	0.61	0.63	0.60	0.28

HOL   fua

	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    0.73   1.45
CAN    0.76   0.77   5.27
CHE    0.82   0.81   0.93   12.04
DEU    0.73   0.84   0.93   0.87   12.23
DFS    0.75   0.85   0.91   0.89   0.88   11.89
ESP    0.77   0.80   0.89   0.87   0.85   0.84   0.68
FRA    0.78   0.89   0.90   0.90   0.90   0.92   0.86   1.01
GBR    0.77   0.79   0.94   0.89   0.95   0.87   0.87   0.89   1.28
ITA    0.69   0.66   0.88   0.84   0.85   0.76   0.85   0.82   0.90   1.28
NLD    0.73   0.83   0.92   0.91   0.95   0.88   0.87   0.91   0.93   0.86   4.74
USA    0.74   0.70   0.94   0.88   0.89   0.85   0.89   0.85   0.93   0.92   0.90   1.38
HUN    0.76   0.78   0.89   0.87   0.87   0.88   0.84   0.85   0.87   0.79   0.84   0.82   1.07
POL    0.69   0.81   0.89   0.87   0.93   0.87   0.84   0.89   0.92   0.86   0.90   0.86   0.88   14.94
NZL    0.77   0.77   0.83   0.80   0.83   0.80   0.80   0.85   0.86   0.76   0.84   0.84   0.75   0.79   0.41
ZAF    0.74   0.77   0.86   0.82   0.87   0.86   0.82   0.83   0.89   0.70   0.84   0.82   0.83   0.80   0.79   0.85
JPN    0.74   0.76   0.94   0.91   0.89   0.91   0.85   0.87   0.90   0.85   0.89   0.91   0.88   0.88   0.81   0.81   1.44
CZE    0.72   0.85   0.86   0.85   0.92   0.90   0.79   0.88   0.89   0.75   0.87   0.78   0.91   0.89   0.76   0.90   0.85   14.23
EST    0.64   0.77   0.80   0.77   0.80   0.86   0.67   0.81   0.77   0.60   0.79   0.70   0.82   0.80   0.67   0.74   0.73   0.81   18.29
IRL    0.76   0.73   0.83   0.80   0.82   0.73   0.85   0.81   0.91   0.85   0.83   0.88   0.70   0.80   0.83   0.77   0.77   0.72   0.63   1.17
KOR    0.67   0.76   0.68   0.73   0.70   0.78   0.75   0.74   0.68   0.57   0.67   0.63   0.78   0.73   0.68   0.78   0.72   0.81   0.64   0.66   3.15
SVN    0.49   0.75   0.50   0.56   0.68   0.54   0.63   0.61   0.51   0.48   0.65   0.50   0.54   0.60   0.54   0.50   0.56   0.64   0.46   0.51   0.66   18.09
PRT    0.56   0.73   0.66   0.63   0.62   0.69   0.72   0.66   0.63   0.55   0.64   0.63   0.59   0.62   0.70   0.65   0.69   0.61   0.58   0.63   0.68   0.61   1.35
LVA    0.65   0.84   0.77   0.74   0.79   0.78   0.69   0.80   0.75   0.63   0.77   0.70   0.81   0.79   0.76   0.71   0.75   0.83   0.72   0.64   0.72   0.62   0.61   0.34

-------------------------------------------------------------------------------
HOL    ruh
-------------------------------------------------------------------------------
       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    0.82   1.24
CAN    0.76   0.90   5.63
CHE    0.81   0.91   0.93   11.30
DEU    0.80   0.89   0.88   0.89   12.99
DFS    0.77   0.90   0.85   0.91   0.95   11.56
ESP    0.80   0.87   0.85   0.87   0.91   0.91   0.68
FRA    0.77   0.88   0.83   0.87   0.91   0.93   0.89   1.01
GBR    0.76   0.83   0.72   0.79   0.84   0.89   0.85   0.88   1.38
ITA    0.69   0.74   0.69   0.70   0.80   0.83   0.84   0.84   0.81   1.24
NLD    0.74   0.84   0.76   0.83   0.92   0.93   0.89   0.90   0.88   0.83   4.13
USA    0.76   0.85   0.81   0.84   0.90   0.93   0.89   0.88   0.92   0.87   0.88   1.46
HUN    0.79   0.82   0.80   0.78   0.87   0.84   0.88   0.82   0.81   0.81   0.82   0.83   0.99
POL    0.70   0.83   0.71   0.77   0.84   0.89   0.87   0.88   0.84   0.87   0.88   0.85   0.83   13.26
NZL    0.79   0.82   0.73   0.82   0.83   0.87   0.83   0.85   0.91   0.77   0.84   0.89   0.82   0.80   0.39
ZAF    0.69   0.74   0.69   0.79   0.75   0.83   0.79   0.75   0.86   0.75   0.78   0.81   0.76   0.70   0.81   0.79
JPN    0.80   0.92   0.92   0.92   0.91   0.92   0.93   0.90   0.82   0.81   0.86   0.87   0.85   0.88   0.82   0.78   1.46
CZE    0.78   0.88   0.88   0.85   0.89   0.85   0.81   0.82   0.72   0.70   0.76   0.77   0.85   0.72   0.76   0.78   0.86   14.36
EST    0.70   0.74   0.72   0.75   0.79   0.82   0.77   0.83   0.74   0.81   0.77   0.82   0.77   0.83   0.77   0.68   0.82   0.76   17.26
IRL    0.70   0.76   0.69   0.72   0.77   0.83   0.81   0.81   0.91   0.85   0.84   0.88   0.78   0.79   0.83   0.78   0.76   0.69   0.77   1.04
KOR    0.71   0.80   0.84   0.79   0.74   0.71   0.77   0.70   0.69   0.69   0.69   0.69   0.71   0.69   0.71   0.70   0.83   0.78   0.70   0.70   3.29
SVN    0.76   0.92   0.89   0.84   0.90   0.90   0.88   0.88   0.76   0.80   0.84   0.82   0.78   0.80   0.73   0.72   0.90   0.87   0.78   0.75   0.77   14.89
PRT    0.70   0.78   0.69   0.69   0.77   0.82   0.82   0.81   0.85   0.80   0.82   0.80   0.78   0.80   0.76   0.75   0.78   0.69   0.70   0.79   0.69   0.79   1.15
LVA    0.69   0.72   0.70   0.70   0.77   0.73   0.72   0.72   0.70   0.69   0.73   0.70   0.69   0.69   0.70   0.69   0.73   0.71   0.70   0.69   0.69   0.78   0.69   0.42

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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   1.46
CAN    0.77   0.77   5.39
CHE    0.77   0.86   0.91   11.90
DEU    0.73   0.80   0.92   0.94   11.53
DFS    0.70   0.86   0.81   0.89   0.83   11.56
ESP    0.77   0.68   0.82   0.81   0.80   0.79   0.67
FRA    0.74   0.86   0.78   0.86   0.77   0.91   0.82   1.02
GBR    0.81   0.63   0.79   0.80   0.74   0.82   0.90   0.87   1.35
ITA    0.68   0.66   0.76   0.77   0.77   0.76   0.88   0.80   0.84   1.39
NLD    0.80   0.78   0.83   0.87   0.81   0.90   0.90   0.92   0.93   0.80   4.25
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USA   0.78   0.68   0.81   0.80   0.75   0.87   0.91   0.87   0.94   0.86   0.93   1.44
HUN   0.72   0.89   0.81   0.90   0.84   0.91   0.78   0.91   0.78   0.76   0.85   0.80   1.01
POL   0.72   0.80   0.89   0.91   0.95   0.82   0.82   0.77   0.73   0.76   0.82   0.76   0.87  16.00
NZL   0.59   0.58   0.57   0.57   0.57   0.57   0.68   0.57   0.60   0.63   0.57   0.66   0.57   0.58   0.38
ZAF   0.76   0.61   0.65   0.67   0.58   0.75   0.77   0.73   0.81   0.60   0.78   0.82   0.76   0.65   0.60   0.84
JPN   0.59   0.95   0.73   0.84   0.75   0.84   0.62   0.88   0.63   0.63   0.75   0.66   0.88   0.77   0.57   0.58   1.63
CZE   0.58   0.88   0.81   0.85   0.87   0.77   0.65   0.73   0.60   0.68   0.68   0.63   0.88   0.88   0.57   0.57   0.84  13.89
EST   0.70   0.88   0.81   0.86   0.84   0.85   0.71   0.81   0.70   0.61   0.80   0.69   0.86   0.84   0.56   0.63   0.87   0.86  18.87
IRL   0.77   0.67   0.82   0.79   0.78   0.75   0.87   0.80   0.90   0.86   0.85   0.87   0.75   0.78   0.71   0.72   0.63   0.67   0.67   1.07
KOR   0.64   0.72   0.83   0.76   0.82   0.68   0.71   0.63   0.59   0.70   0.67   0.67   0.73   0.85   0.57   0.63   0.66   0.75   0.64   0.68   2.48
SVN   0.64   0.77   0.87   0.86   0.90   0.75   0.67   0.66   0.59   0.59   0.65   0.62   0.75   0.87   0.58   0.54   0.72   0.84   0.80   0.69   0.75  19.84
PRT   0.67   0.65   0.77   0.78   0.82   0.70   0.79   0.65   0.71   0.73   0.72   0.68   0.73   0.80   0.57   0.57   0.57   0.72   0.66   0.74   0.69   0.71   1.47
LVA   0.58   0.58   0.61   0.64   0.62   0.64   0.72   0.69   0.71   0.65   0.64   0.66   0.66   0.64   0.62   0.59   0.58   0.58   0.58   0.71   0.57   0.60   0.63   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   1.35
CAN   0.88   0.96   5.51
CHE   0.92   0.95   0.96  11.75
DEU   0.89   0.96   0.97   0.96  13.14
DFS   0.87   0.94   0.96   0.96   0.96  11.95
ESP   0.88   0.97   0.97   0.96   0.96   0.97   0.80
FRA   0.90   0.96   0.97   0.98   0.98   0.96   0.97   1.08
GBR   0.89   0.97   0.97   0.95   0.96   0.94   0.96   0.96   1.17
ITA   0.87   0.94   0.96   0.96   0.96   0.95   0.97   0.97   0.95   1.33
NLD   0.89   0.96   0.97   0.97   0.98   0.97   0.97   0.98   0.97   0.96   4.79
USA   0.87   0.94   0.96   0.96   0.95   0.96   0.97   0.97   0.96   0.96   0.96   1.44
HUN   0.87   0.96   0.96   0.95   0.95   0.94   0.96   0.95   0.95   0.95   0.94   0.95   1.01
POL   0.87   0.95   0.94   0.95   0.95   0.93   0.94   0.95   0.93   0.94   0.95   0.94   0.94  13.53
ZAF   0.87   0.93   0.94   0.91   0.92   0.90   0.92   0.91   0.95   0.88   0.92   0.94   0.92   0.90   0.92
JPN   0.89   0.95   0.97   0.97   0.96   0.97   0.97   0.97   0.94   0.96   0.96   0.97   0.94   0.95   0.89   1.22
CZE   0.88   0.95   0.97   0.94   0.95   0.93   0.95   0.93   0.95   0.94   0.95   0.92   0.96   0.92   0.93   0.92  13.36
EST   0.87   0.93   0.95   0.93   0.94   0.94   0.95   0.92   0.93   0.93   0.94   0.94   0.94   0.94   0.92   0.93   0.94  15.43
IRL   0.87   0.93   0.90   0.91   0.89   0.87   0.91   0.91   0.96   0.89   0.92   0.93   0.88   0.89   0.94   0.89   0.88   0.90   1.31
KOR   0.87   0.87   0.88   0.88   0.87   0.88   0.90   0.88   0.87   0.88   0.87   0.89   0.88   0.87   0.87   0.91   0.87   0.88   0.87   4.41
SVN   0.88   0.95   0.97   0.95   0.96   0.92   0.96   0.95   0.95   0.96   0.96   0.93   0.95   0.95   0.90   0.94   0.95   0.95   0.89   0.87  15.94
PRT   0.87   0.92   0.91   0.90   0.92   0.90   0.91   0.90   0.91   0.92   0.91   0.90   0.92   0.88   0.90   0.89   0.94   0.90   0.87   0.87   0.91   1.39
LVA   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   0.87   0.87   0.87   0.88   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   1.44
CAN   0.94   0.97   6.02
CHE   0.96   0.97   0.98  11.94
DEU   0.94   0.96   0.98   0.97  13.88
DFS   0.89   0.96   0.96   0.94   0.96  10.88
ESP   0.92   0.93   0.97   0.95   0.97   0.93   0.83
FRA   0.93   0.99   0.97   0.97   0.96   0.95   0.93   1.06
GBR   0.91   0.90   0.95   0.92   0.94   0.91   0.96   0.89   1.33
ITA   0.86   0.86   0.87   0.86   0.87   0.86   0.86   0.86   0.86   1.13
NLD   0.93   0.97   0.98   0.97   0.99   0.96   0.96   0.96   0.94   0.87   5.00
USA   0.86   0.87   0.92   0.87   0.90   0.91   0.92   0.86   0.95   0.86   0.91   1.35
HUN   0.95   0.94   0.95   0.95   0.95   0.91   0.96   0.92   0.93   0.86   0.94   0.88   0.96
POL   0.89   0.92   0.96   0.93   0.95   0.93   0.96   0.92   0.96   0.86   0.96   0.92   0.94  15.61
NZL   0.91   0.89   0.92   0.91   0.90   0.86   0.89   0.90   0.91   0.86   0.92   0.87   0.91   0.91   0.31
ZAF   0.90   0.91   0.94   0.92   0.91   0.88   0.92   0.91   0.93   0.86   0.92   0.88   0.93   0.91   0.91   0.82
JPN   0.93   0.99   0.97   0.97   0.95   0.95   0.94   0.98   0.90   0.86   0.97   0.86   0.93   0.93   0.89   0.92   1.48
CZE   0.94   0.95   0.96   0.96   0.95   0.92   0.94   0.94   0.91   0.86   0.95   0.86   0.96   0.93   0.90   0.92   0.95  13.13
EST   0.94   0.95   0.96   0.96   0.95   0.92   0.94   0.94   0.91   0.86   0.96   0.87   0.94   0.93   0.89   0.90   0.96   0.95  18.74
IRL   0.87   0.86   0.91   0.88   0.90   0.86   0.90   0.86   0.95   0.86   0.89   0.90   0.87   0.89   0.87   0.89   0.86   0.86   0.88   1.30
KOR   0.87   0.91   0.89   0.90   0.88   0.88   0.89   0.89   0.86   0.86   0.89   0.86   0.90   0.88   0.86   0.89   0.92   0.89   0.89   0.86   3.00
SVN   0.93   0.96   0.96   0.96   0.97   0.95   0.97   0.94   0.94   0.86   0.97   0.89   0.94   0.93   0.88   0.88   0.95   0.93   0.94   0.90   0.89  15.62
PRT   0.89   0.90   0.92   0.91   0.92   0.88   0.93   0.89   0.90   0.86   0.91   0.86   0.92   0.92   0.86   0.87   0.90   0.92   0.90   0.86   0.86   0.93   1.45
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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    0.86    0.86    0.86    0.39
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HOL    ft1
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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       0.92    1.38
CAN       0.94    0.92    5.16
CHE       0.92    0.97    0.91   11.29
DEU       0.93    0.98    0.95    0.97   13.51
DFS       0.92    0.97    0.92    0.98    0.98   10.81
ESP       0.92    0.98    0.92    0.96    0.98    0.97    1.07
FRA       0.94    0.90    0.98    0.89    0.93    0.91    0.91    1.03
GBR       0.94    0.97    0.95    0.95    0.98    0.95    0.97    0.94    1.31
ITA       0.89    0.92    0.92    0.90    0.93    0.91    0.91    0.92    0.95    1.41
NLD       0.93    0.98    0.94    0.97    0.99    0.98    0.98    0.92    0.98    0.92    4.88
USA       0.93    0.94    0.95    0.94    0.96    0.95    0.96    0.94    0.97    0.92    0.96    1.41
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    1.10
POL       0.92    0.97    0.91    0.97    0.98    0.98    0.97    0.90    0.96    0.92    0.98    0.94    0.96   14.86
ZAF       0.91    0.92    0.89    0.91    0.91    0.92    0.94    0.89    0.92    0.89    0.92    0.91    0.91    0.93    0.86
JPN       0.93    0.98    0.93    0.98    0.98    0.98    0.98    0.92    0.97    0.92    0.98    0.97    0.95    0.98    0.94    1.40
CZE       0.92    0.97    0.92    0.97    0.98    0.97    0.97    0.91    0.96    0.92    0.97    0.95    0.95    0.98    0.92    0.98   14.22
EST       0.90    0.94    0.89    0.95    0.96    0.96    0.94    0.89    0.93    0.91    0.95    0.92    0.95    0.97    0.88    0.95    0.96   16.42
IRL       0.91    0.94    0.94    0.91    0.94    0.92    0.93    0.93    0.97    0.93    0.93    0.94    0.89    0.92    0.89    0.93    0.93    0.90    1.74
KOR       0.89    0.92    0.89    0.92    0.92    0.93    0.94    0.89    0.92    0.89    0.93    0.91    0.91    0.93    0.89    0.94    0.91    0.91    0.89    4.10
SVN       0.89    0.94    0.89    0.95    0.96    0.93    0.94    0.89    0.94    0.92    0.96    0.91    0.93    0.94    0.89    0.94    0.93    0.92    0.91    0.89   17.99
PRT       0.89    0.95    0.91    0.94    0.95    0.94    0.93    0.89    0.93    0.92    0.95    0.92    0.91    0.94    0.89    0.94    0.95    0.93    0.92    0.89    0.94    1.84
LVA       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    0.89    0.89    0.89    0.89    0.89    0.89    0.89    0.89    0.46
NZL       0.96    0.93    0.95    0.92    0.94    0.92    0.93    0.95    0.95    0.91    0.94    0.94    0.90    0.93    0.89    0.93    0.92    0.88    0.92    0.90    0.88    0.90    0.87    0.52
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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       0.92    1.41
CAN       0.88    0.97    6.08
CHE       0.91    0.97    0.98   11.87
DEU       0.89    0.96    0.97    0.97   14.06
DFS       0.86    0.94    0.94    0.94    0.96   11.03
ESP       0.89    0.96    0.97    0.96    0.97    0.95    0.82
FRA       0.89    0.97    0.98    0.98    0.97    0.95    0.97    1.00
GBR       0.90    0.96    0.97    0.96    0.97    0.95    0.96    0.97    1.39
ITA       0.86    0.89    0.89    0.89    0.92    0.91    0.91    0.92    0.91    1.24
NLD       0.90    0.96    0.98    0.97    0.98    0.97    0.98    0.97    0.98    0.92    4.86
USA       0.88    0.94    0.95    0.93    0.96    0.97    0.96    0.94    0.96    0.91    0.97    1.54
POL       0.86    0.95    0.95    0.94    0.97    0.95    0.96    0.95    0.95    0.91    0.96    0.93   14.74
NZL       0.91    0.95    0.94    0.93    0.93    0.89    0.92    0.95    0.95    0.86    0.93    0.90    0.93    0.47
JPN       0.90    0.97    0.98    0.97    0.96    0.96    0.97    0.97    0.96    0.91    0.98    0.96    0.95    0.93    1.55
CZE       0.89    0.96    0.95    0.94    0.96    0.94    0.94    0.94    0.95    0.90    0.95    0.94    0.95    0.91    0.95   14.36
EST       0.92    0.95    0.94    0.95    0.96    0.92    0.94    0.95    0.95    0.90    0.96    0.92    0.94    0.90    0.94    0.94   16.22
IRL       0.86    0.90    0.89    0.88    0.87    0.87    0.88    0.89    0.90    0.86    0.87    0.87    0.86    0.90    0.88    0.86    0.86    1.25
KOR       0.86    0.93    0.94    0.94    0.93    0.93    0.96    0.94    0.91    0.90    0.94    0.91    0.92    0.89    0.95    0.89    0.90    0.86    2.05
SVN       0.87    0.93    0.94    0.93    0.95    0.92    0.95    0.94    0.94    0.90    0.96    0.92    0.94    0.91    0.93    0.93    0.93    0.88    0.92   14.43
PRT       0.86    0.89    0.90    0.88    0.91    0.89    0.92    0.89    0.92    0.86    0.90    0.90    0.92    0.88    0.90    0.89    0.88    0.86    0.86    0.91    1.42
ZAF       0.88    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    0.57
HUN       0.88    0.95    0.93    0.94    0.96    0.94    0.96    0.95    0.95    0.90    0.96    0.94    0.96    0.91    0.95    0.95    0.94    0.87    0.90    0.94    0.90    0.86    1.03
LVA       0.86    0.91    0.89    0.89    0.89    0.89    0.91    0.91    0.90    0.86    0.91    0.86    0.90    0.88    0.89    0.89    0.90    0.86    0.89    0.90    0.88    0.86    0.91    0.44
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HOL    ocs
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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       0.94
BEL       0.61    1.21
CAN       0.62    0.66    4.91
CHE       0.61    0.78    0.83   10.95
DEU       0.49    0.68    0.73    0.84   12.61
```

```
DFS    0.61    0.62    0.68    0.80    0.78   10.33
ESP    0.65    0.65    0.74    0.81    0.77    0.83    0.69
FRA    0.55    0.75    0.70    0.88    0.82    0.86    0.88    1.03
GBR    0.66    0.70    0.76    0.89    0.87    0.86    0.84    0.88    1.00
ITA    0.51    0.70    0.69    0.80    0.77    0.80    0.86    0.88    0.81    0.79
NLD    0.57    0.65    0.72    0.83    0.88    0.89    0.86    0.87    0.88    0.81    2.98
USA    0.60    0.62    0.73    0.85    0.81    0.86    0.84    0.86    0.88    0.84    0.87    0.87
HUN    0.57    0.70    0.69    0.80    0.81    0.72    0.77    0.77    0.81    0.78    0.73    0.76    1.01
POL    0.57    0.80    0.68    0.79    0.79    0.71    0.75    0.79    0.80    0.80    0.76    0.76    0.76   15.09
NZL    0.77    0.47    0.66    0.64    0.65    0.61    0.62    0.57    0.72    0.52    0.66    0.69    0.60    0.52    0.30
JPN    0.58    0.79    0.74    0.91    0.71    0.73    0.79    0.81    0.77    0.81    0.76    0.81    0.73    0.83    0.53    0.58
CZE    0.59    0.67    0.78    0.82    0.85    0.75    0.77    0.78    0.80    0.73    0.78    0.77    0.83    0.75    0.65    0.70   12.98
EST    0.45    0.57    0.64    0.59    0.65    0.57    0.56    0.57    0.56    0.62    0.55    0.66    0.56    0.50    0.57    0.70   18.50
IRL    0.57    0.48    0.65    0.67    0.63    0.64    0.64    0.63    0.79    0.62    0.61    0.65    0.63    0.65    0.58    0.57    0.61    0.49    0.89
KOR    0.57    0.56    0.55    0.59    0.56    0.57    0.66    0.64    0.55    0.65    0.58    0.60    0.57    0.64    0.47    0.60    0.55    0.59    0.41    6.06
SVN    0.50    0.77    0.55    0.66    0.66    0.64    0.61    0.68    0.69    0.67    0.60    0.61    0.60    0.80    0.44    0.64    0.59    0.62    0.52    0.57   14.35
PRT    0.55    0.63    0.61    0.68    0.73    0.73    0.76    0.77    0.80    0.77    0.78    0.76    0.69    0.76    0.51    0.75    0.69    0.56    0.57    0.62    0.60    0.29

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HOL    ous
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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    1.28
BEL    0.66    1.28
CAN    0.68    0.81    6.26
CHE    0.79    0.84    0.92   11.66
DEU    0.73    0.80    0.89    0.91   13.51
DFS    0.66    0.83    0.88    0.87    0.85   13.77
ESP    0.74    0.68    0.75    0.86    0.82    0.71    0.72
FRA    0.66    0.80    0.88    0.93    0.91    0.88    0.80    0.96
GBR    0.83    0.68    0.77    0.85    0.81    0.69    0.86    0.74    1.43
ITA    0.68    0.79    0.84    0.92    0.86    0.85    0.84    0.90    0.82    1.18
NLD    0.69    0.82    0.90    0.94    0.91    0.85    0.81    0.92    0.78    0.86    4.76
USA    0.73    0.71    0.87    0.90    0.83    0.73    0.84    0.79    0.87    0.85    0.86    1.17
HUN    0.71    0.78    0.81    0.86    0.85    0.76    0.80    0.78    0.79    0.77    0.76    0.76    1.16
POL    0.72    0.81    0.75    0.80    0.81    0.70    0.71    0.76    0.80    0.80    0.77    0.75    0.72   15.23
NZL    0.81    0.67    0.80    0.88    0.79    0.67    0.78    0.77    0.84    0.73    0.83    0.87    0.76    0.74    0.42
JPN    0.75    0.81    0.87    0.92    0.88    0.77    0.78    0.83    0.84    0.87    0.86    0.87    0.79    0.86    0.81    0.74
CZE    0.67    0.86    0.87    0.91    0.91    0.88    0.77    0.90    0.74    0.85    0.87    0.78    0.88    0.77    0.74    0.83   12.84
EST    0.69    0.83    0.87    0.89    0.84    0.93    0.76    0.88    0.75    0.86    0.85    0.73    0.81    0.70    0.74    0.77    0.88   16.13
IRL    0.81    0.66    0.67    0.78    0.73    0.66    0.80    0.66    0.95    0.75    0.71    0.82    0.72    0.74    0.81    0.76    0.67    0.70    0.93
SVN    0.68    0.77    0.69    0.70    0.73    0.69    0.69    0.69    0.69    0.69    0.69    0.69    0.69    0.85    0.69    0.72    0.71    0.71    0.68   14.77
PRT    0.69    0.68    0.74    0.75    0.74    0.68    0.76    0.71    0.79    0.75    0.77    0.76    0.71    0.75    0.74    0.79    0.71    0.70    0.73    0.69    0.42

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HOL    ofl
--------------------------------------------------------------------------------
        AUS     BEL     CAN     CHE     DEU     DFS     ESP     FRA     GBR     ITA     NLD     USA     HUN     POL     JPN     CZE     EST     IRL     SVN     PRT
AUS    0.76
BEL    0.65    1.70
CAN    0.34    0.62    4.76
CHE    0.58    0.76    0.82   11.38
DEU    0.38    0.76    0.71    0.79   11.61
DFS    0.35    0.59    0.79    0.74    0.75   12.58
ESP    0.41    0.69    0.73    0.76    0.71    0.80    0.76
FRA    0.55    0.80    0.67    0.77    0.76    0.58    0.75    0.96
GBR    0.52    0.73    0.66    0.79    0.73    0.69    0.79    0.84    1.59
ITA    0.52    0.72    0.59    0.71    0.71    0.57    0.73    0.78    0.67    1.58
NLD    0.45    0.82    0.66    0.73    0.76    0.59    0.65    0.81    0.73    0.67    4.84
USA    0.52    0.69    0.60    0.79    0.73    0.65    0.75    0.70    0.72    0.79    0.68    1.45
HUN    0.60    0.76    0.56    0.62    0.68    0.57    0.57    0.75    0.62    0.71    0.68    0.69    1.16
POL    0.50    0.66    0.56    0.69    0.66    0.56    0.62    0.66    0.56    0.73    0.56    0.78    0.72   19.23
JPN    0.46    0.63    0.65    0.79    0.77    0.70    0.70    0.58    0.58    0.73    0.59    0.85    0.59    0.75    0.54
CZE    0.49    0.75    0.61    0.74    0.78    0.59    0.66    0.67    0.63    0.78    0.62    0.83    0.79    0.83    0.79   17.34
EST    0.47    0.64    0.58    0.60    0.65    0.58    0.58    0.67    0.58    0.58    0.75    0.59    0.67    0.57    0.59    0.67   19.60
IRL    0.59    0.72    0.61    0.80    0.67    0.62    0.68    0.69    0.79    0.68    0.63    0.67    0.66    0.62    0.69    0.63    0.43    1.35
SVN    0.43    0.78    0.57    0.65    0.67    0.59    0.57    0.70    0.57    0.67    0.66    0.69    0.82    0.72    0.70    0.73    0.69    0.61   22.16
PRT    0.35    0.56    0.56    0.56    0.56    0.56    0.60    0.67    0.58    0.66    0.62    0.60    0.64    0.59    0.56    0.59    0.66    0.45    0.63    0.19
```

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HOL    loc
--------------------------------------------------------------------------------
      BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    CZE    IRL    KOR    SVN    PRT    EST    HUN    POL
BEL   1.79
CAN   0.85   6.67
CHE   0.56   0.61   12.47
DEU   0.66   0.75   0.69   11.43
DFS   0.88   0.91   0.50   0.69   13.18
ESP   0.63   0.74   0.68   0.74   0.75   0.85
FRA   0.79   0.77   0.73   0.82   0.70   0.76   0.96
GBR   0.65   0.68   0.89   0.82   0.65   0.79   0.85   1.51
ITA   0.59   0.68   0.63   0.74   0.60   0.77   0.77   0.73   1.90
NLD   0.84   0.82   0.69   0.82   0.78   0.70   0.81   0.78   0.63   4.26
USA   0.65   0.78   0.50   0.77   0.74   0.74   0.72   0.67   0.74   0.68   1.53
CZE   0.51   0.60   0.56   0.61   0.61   0.65   0.61   0.64   0.69   0.50   0.60   20.32
IRL   0.57   0.57   0.53   0.63   0.52   0.64   0.69   0.73   0.62   0.62   0.56   0.51   1.65
KOR   0.55   0.53   0.51   0.51   0.51   0.53   0.57   0.51   0.51   0.51   0.50   0.51   0.51   9.86
SVN   0.76   0.73   0.57   0.78   0.75   0.71   0.82   0.66   0.69   0.70   0.70   0.66   0.54   0.53   26.61
PRT   0.50   0.50   0.53   0.57   0.50   0.61   0.53   0.59   0.59   0.52   0.50   0.60   0.50   0.50   0.65   1.90
EST   0.53   0.51   0.53   0.54   0.52   0.52   0.54   0.52   0.51   0.56   0.51   0.52   0.53   0.64   0.71   0.53   22.33
HUN   0.68   0.69   0.51   0.66   0.73   0.64   0.75   0.67   0.64   0.64   0.66   0.82   0.51   0.53   0.77   0.55   0.56   1.16
POL   0.54   0.65   0.54   0.68   0.56   0.58   0.69   0.56   0.70   0.51   0.73   0.74   0.54   0.51   0.81   0.52   0.52   0.67   19.46


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HOL    bcs
--------------------------------------------------------------------------------
      BEL    CHE    DEU    DFS    FRA    GBR    ITA    NLD    USA    CZE    JPN    IRL    KOR    CAN    PRT    ESP    SVN    EST    HUN    NZL    POL
BEL   0.95
CHE   0.71   11.72
DEU   0.71   0.91   14.09
DFS   0.73   0.89   0.95   12.18
FRA   0.71   0.93   0.95   0.95   0.95
GBR   0.75   0.90   0.90   0.90   0.92   1.61
ITA   0.71   0.91   0.95   0.95   0.96   0.90   6.53
NLD   0.71   0.94   0.96   0.95   0.95   0.91   0.93   5.02
USA   0.76   0.71   0.81   0.80   0.81   0.75   0.78   0.75   1.35
CZE   0.72   0.87   0.96   0.95   0.92   0.89   0.94   0.93   0.77   13.86
JPN   0.77   0.93   0.97   0.97   0.97   0.91   0.96   0.95   0.84   0.95   1.68
IRL   0.71   0.86   0.78   0.85   0.87   0.94   0.82   0.85   0.71   0.77   0.85   0.97
KOR   0.72   0.74   0.84   0.84   0.86   0.80   0.84   0.79   0.73   0.83   0.87   0.72   2.32
CAN   0.72   0.93   0.96   0.94   0.95   0.94   0.94   0.95   0.82   0.94   0.98   0.86   0.84   5.78
PRT   0.71   0.84   0.88   0.86   0.88   0.87   0.85   0.85   0.71   0.84   0.87   0.77   0.81   0.88   1.74
ESP   0.72   0.87   0.93   0.92   0.94   0.92   0.92   0.90   0.75   0.92   0.94   0.82   0.83   0.94   0.88   1.02
SVN   0.72   0.88   0.92   0.91   0.88   0.82   0.89   0.91   0.71   0.91   0.90   0.74   0.79   0.86   0.76   0.84   20.44
EST   0.72   0.83   0.91   0.87   0.88   0.78   0.89   0.89   0.82   0.89   0.90   0.72   0.75   0.89   0.77   0.81   0.85   16.70
HUN   0.71   0.86   0.93   0.92   0.92   0.87   0.94   0.90   0.76   0.95   0.93   0.76   0.83   0.93   0.85   0.90   0.88   0.84   0.99
NZL   0.71   0.90   0.91   0.91   0.93   0.91   0.91   0.88   0.72   0.87   0.92   0.86   0.82   0.91   0.84   0.86   0.85   0.82   0.89   0.16
POL   0.71   0.86   0.91   0.90   0.89   0.89   0.90   0.87   0.75   0.92   0.92   0.78   0.79   0.91   0.82   0.87   0.86   0.84   0.91   0.86   13.36


--------------------------------------------------------------------------------
JER    sta
--------------------------------------------------------------------------------
      AUS    CAN    DFS    GBR    ITA    NZL    USA    ZAF    NLD    CHE
AUS   0.54
CAN   0.89   6.81
DFS   0.90   0.97   11.72
GBR   0.91   0.96   0.94   1.16
ITA   0.87   0.95   0.93   0.95   1.69
NZL   0.87   0.84   0.86   0.90   0.87   0.37
USA   0.89   0.97   0.95   0.96   0.94   0.89   1.39
ZAF   0.87   0.86   0.84   0.92   0.87   0.89   0.86   8.68
NLD   0.87   0.95   0.97   0.94   0.92   0.85   0.93   0.87   5.15
CHE   0.89   0.96   0.96   0.94   0.93   0.85   0.94   0.86   0.97   11.41


--------------------------------------------------------------------------------
JER    cwi
--------------------------------------------------------------------------------
      AUS    CAN    DFS    GBR    ITA    NZL    USA    ZAF    NLD    CHE
```

```
AUS      0.29
CAN      0.74    6.66
DFS      0.72    0.79   15.54
GBR      0.82    0.91    0.84    1.82
ITA      0.65    0.77    0.69    0.72    1.60
NZL      0.82    0.73    0.66    0.74    0.66    0.37
USA      0.74    0.89    0.79    0.85    0.90    0.69    0.90
ZAF      0.67    0.76    0.74    0.79    0.73    0.75    0.75    8.43
NLD      0.72    0.91    0.89    0.89    0.71    0.69    0.82    0.79    4.62
CHE      0.67    0.85    0.85    0.83    0.81    0.68    0.84    0.71    0.88   12.43
```

JER   bde

	AUS	CAN	DFS	GBR	ITA	NZL	ZAF	NLD	USA	CHE
AUS	0.33									
CAN	0.78	5.69								
DFS	0.75	0.86	13.73							
GBR	0.74	0.87	0.86	1.58						
ITA	0.70	0.73	0.78	0.84	1.53					
NZL	0.78	0.69	0.70	0.69	0.70	0.37				
ZAF	0.79	0.72	0.81	0.80	0.71	0.74	8.63			
NLD	0.70	0.82	0.83	0.89	0.87	0.70	0.78	4.55		
USA	0.68	0.70	0.73	0.76	0.90	0.69	0.71	0.86	0.90	
CHE	0.74	0.87	0.92	0.89	0.83	0.71	0.79	0.89	0.82	13.52

JER   ang

	AUS	CAN	DFS	GBR	ITA	USA	ZAF	NLD	CHE
AUS	0.33								
CAN	0.67	7.42							
DFS	0.69	0.69	11.77						
GBR	0.81	0.83	0.70	1.40					
ITA	0.73	0.85	0.83	0.84	1.71				
USA	0.70	0.83	0.70	0.83	0.79	0.90			
ZAF	0.62	0.63	0.66	0.79	0.82	0.67	8.54		
NLD	0.71	0.82	0.76	0.81	0.80	0.74	0.65	5.64	
CHE	0.65	0.78	0.75	0.71	0.75	0.72	0.65	0.76	10.02

JER   ran

	AUS	CAN	DFS	GBR	ITA	NZL	USA	ZAF	NLD	CHE
AUS	0.35									
CAN	0.88	5.87								
DFS	0.89	0.96	11.49							
GBR	0.94	0.95	0.95	1.33						
ITA	0.88	0.95	0.94	0.95	1.63					
NZL	0.90	0.88	0.88	0.92	0.90	0.31				
USA	0.89	0.95	0.96	0.97	0.94	0.91	1.15			
ZAF	0.88	0.88	0.88	0.89	0.88	0.88	0.88	8.89		
NLD	0.90	0.96	0.95	0.96	0.94	0.89	0.94	0.91	4.96	
CHE	0.91	0.96	0.95	0.95	0.94	0.90	0.94	0.89	0.95	12.86

JER   rwi

	AUS	CAN	DFS	GBR	ITA	NZL	USA	ZAF	NLD	CHE
AUS	0.32									
CAN	0.80	6.29								
DFS	0.81	0.91	12.04							
GBR	0.80	0.93	0.86	1.37						
ITA	0.77	0.85	0.81	0.84	1.46					
NZL	0.88	0.83	0.81	0.80	0.80	0.30				
USA	0.76	0.81	0.80	0.83	0.88	0.78	0.87			
ZAF	0.77	0.78	0.78	0.80	0.79	0.77	0.78	9.05		
NLD	0.84	0.93	0.90	0.87	0.78	0.84	0.80	0.79	5.01	
CHE	0.82	0.92	0.82	0.85	0.78	0.80	0.78	0.78	0.91	13.15

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--------------------------------------------------------------------------------
JER    rls
--------------------------------------------------------------------------------
         AUS    CAN    DFS    GBR    ITA    NZL    USA    ZAF    NLD    CHE
AUS      0.18
CAN      0.67   6.28
DFS      0.67   0.90  12.57
GBR      0.71   0.85   0.74   1.66
ITA      0.67   0.86   0.81   0.80   1.89
NZL      0.66   0.66   0.67   0.67   0.68   0.12
USA      0.66   0.95   0.87   0.86   0.85   0.66   0.82
ZAF      0.70   0.68   0.67   0.73   0.67   0.82   0.70  11.81
NLD      0.71   0.91   0.91   0.84   0.84   0.67   0.87   0.73   3.83
CHE      0.73   0.92   0.86   0.80   0.80   0.68   0.85   0.70   0.91   9.68

--------------------------------------------------------------------------------
JER    rlr
--------------------------------------------------------------------------------
         AUS    CAN    DFS    ITA    ZAF    NLD    USA    CHE
AUS      0.21
CAN      0.52   6.43
DFS      0.53   0.80  13.76
ITA      0.56   0.81   0.72   1.44
ZAF      0.51   0.52   0.52   0.55  12.02
NLD      0.57   0.86   0.89   0.73   0.59   5.51
USA      0.50   0.69   0.61   0.83   0.52   0.73   0.82
CHE      0.62   0.68   0.62   0.61   0.55   0.70   0.58  12.74

--------------------------------------------------------------------------------
JER    fan
--------------------------------------------------------------------------------
         AUS    CAN    DFS    GBR    ITA    USA    ZAF    NLD    CHE
AUS      0.22
CAN      0.61   6.70
DFS      0.62   0.87  12.76
GBR      0.69   0.79   0.76   1.50
ITA      0.62   0.74   0.68   0.70   1.64
USA      0.61   0.87   0.83   0.84   0.80   0.77
ZAF      0.66   0.64   0.66   0.81   0.65   0.73   9.48
NLD      0.66   0.73   0.77   0.85   0.70   0.75   0.69   4.01
CHE      0.64   0.81   0.81   0.70   0.69   0.75   0.66   0.71  11.97

--------------------------------------------------------------------------------
JER    fua
--------------------------------------------------------------------------------
         AUS    CAN    DFS    GBR    ITA    NZL    USA    ZAF    NLD    CHE
AUS      0.37
CAN      0.71   5.80
DFS      0.68   0.86  12.73
GBR      0.74   0.94   0.86   1.71
ITA      0.67   0.86   0.74   0.87   1.49
NZL      0.81   0.71   0.72   0.80   0.69   0.42
USA      0.73   0.93   0.87   0.92   0.89   0.72   1.38
ZAF      0.69   0.90   0.88   0.92   0.78   0.75   0.88  11.77
NLD      0.72   0.91   0.87   0.92   0.86   0.80   0.90   0.83   5.80
CHE      0.76   0.92   0.85   0.87   0.80   0.71   0.87   0.88   0.89  11.93

--------------------------------------------------------------------------------
JER    ruh
--------------------------------------------------------------------------------
         AUS    CAN    DFS    GBR    ITA    NZL    USA    ZAF    NLD    CHE
AUS      0.35
CAN      0.72   6.74
DFS      0.73   0.83  10.69
GBR      0.79   0.78   0.84   1.41
ITA      0.71   0.72   0.79   0.82   1.34
NZL      0.71   0.71   0.77   0.77   0.80   0.41
USA      0.77   0.82   0.90   0.90   0.83   0.75   1.12
```

```
ZAF      0.81    0.70    0.78    0.86    0.84    0.77    0.83    9.13
NLD      0.74    0.76    0.92    0.88    0.83    0.82    0.90    0.76    4.48
CHE      0.78    0.91    0.85    0.81    0.71    0.76    0.84    0.74    0.83   12.43


------------------------------------------------------------------------------------
JER    usu
------------------------------------------------------------------------------------
         AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS      0.38
CAN      0.73    6.32
DFS      0.71    0.82   13.45
GBR      0.79    0.85    0.85    1.74
ITA      0.66    0.76    0.74    0.83    1.60
NZL      0.58    0.59    0.59    0.62    0.63    0.40
USA      0.75    0.82    0.90    0.86    0.83    0.60    0.90
ZAF      0.73    0.75    0.71    0.79    0.63    0.59    0.73    9.87
NLD      0.81    0.82    0.88    0.92    0.80    0.60    0.90    0.79    4.95
CHE      0.77    0.90    0.85    0.81    0.78    0.61    0.84    0.76    0.86   11.44


------------------------------------------------------------------------------------
JER    ude
------------------------------------------------------------------------------------
         AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE
AUS      0.35
CAN      0.91    5.58
DFS      0.88    0.93   12.22
GBR      0.89    0.97    0.93    1.46
ITA      0.91    0.95    0.94    0.94    1.64
USA      0.88    0.96    0.95    0.94    0.95    1.62
ZAF      0.87    0.88    0.88    0.89    0.88    0.88   10.28
NLD      0.89    0.97    0.96    0.96    0.95    0.96    0.91    5.37
CHE      0.93    0.95    0.93    0.92    0.95    0.95    0.89    0.96   10.01


------------------------------------------------------------------------------------
JER    ftp
------------------------------------------------------------------------------------
         AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS      0.46
CAN      0.89    6.22
DFS      0.88    0.91   12.73
GBR      0.90    0.94    0.88    1.31
ITA      0.87    0.87    0.87    0.87    1.61
NZL      0.87    0.92    0.87    0.88    0.87    0.31
USA      0.87    0.95    0.91    0.93    0.87    0.89    1.16
ZAF      0.87    0.93    0.87    0.92    0.87    0.90    0.89   10.04
NLD      0.92    0.97    0.94    0.93    0.87    0.90    0.91    0.90    5.53
CHE      0.92    0.96    0.93    0.91    0.87    0.89    0.90    0.88    0.96    9.89

------------------------------------------------------------------------------------
JER    ftl
------------------------------------------------------------------------------------
         AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE     NZL
AUS      0.33
CAN      0.91    5.47
DFS      0.92    0.92   13.88
GBR      0.91    0.93    0.95    1.45
ITA      0.90    0.92    0.91    0.93    1.85
USA      0.90    0.91    0.94    0.97    0.92    0.97
ZAF      0.91    0.90    0.92    0.95    0.90    0.96   10.76
NLD      0.93    0.93    0.96    0.97    0.92    0.95    0.93    4.41
CHE      0.91    0.92    0.94    0.96    0.90    0.93    0.92    0.96   11.49
NZL      0.92    0.96    0.93    0.95    0.91    0.94    0.93    0.94    0.94    0.51


------------------------------------------------------------------------------------
JER    rtp
------------------------------------------------------------------------------------
         AUS     CAN     DFS     NZL     ZAF     NLD     USA     CHE
AUS      0.31
CAN      0.87    6.18
```

```
DFS      0.87    0.93   13.11
NZL      0.87    0.95    0.90    0.43
ZAF      0.87    0.89    0.87    0.87    9.19
NLD      0.90    0.97    0.95    0.91    0.87    5.60
USA      0.87    0.93    0.95    0.87    0.86    0.94    1.25
CHE      0.89    0.97    0.94    0.93    0.91    0.96    0.92   11.47

----------------------------------------------------------------------------
JER    ocs
----------------------------------------------------------------------------
         AUS     CAN     DFS     GBR     ITA     NZL     USA     NLD     CHE
AUS      0.77
CAN      0.54    5.18
DFS      0.48    0.61   15.06
GBR      0.62    0.75    0.77    2.93
ITA      0.48    0.70    0.71    0.78    1.26
NZL      0.63    0.58    0.47    0.56    0.53    0.30
USA      0.61    0.78    0.65    0.84    0.78    0.60    0.77
NLD      0.55    0.72    0.84    0.88    0.81    0.63    0.83    3.86
CHE      0.56    0.82    0.68    0.88    0.79    0.54    0.73    0.83    8.21

----------------------------------------------------------------------------
JER    ous
----------------------------------------------------------------------------
         AUS     CAN     DFS     GBR     NZL     USA     NLD     CHE     ITA
AUS      0.77
CAN      0.67    6.29
DFS      0.67    0.81   12.85
GBR      0.73    0.81    0.70    1.51
NZL      0.81    0.72    0.68    0.76    0.44
USA      0.68    0.89    0.82    0.84    0.71    0.90
NLD      0.69    0.89    0.86    0.78    0.80    0.88    5.95
CHE      0.76    0.87    0.78    0.83    0.77    0.85    0.93   10.52
ITA      0.69    0.83    0.86    0.79    0.71    0.84    0.86    0.86    1.62

----------------------------------------------------------------------------
JER    ofl
----------------------------------------------------------------------------
         CAN     DFS     GBR     ITA     USA     NLD     CHE
CAN      5.00
DFS      0.71   13.59
GBR      0.63    0.62    1.30
ITA      0.59    0.67    0.65    1.90
USA      0.62    0.62    0.64    0.74    1.27
NLD      0.65    0.58    0.71    0.66    0.67    5.07
CHE      0.84    0.69    0.70    0.69    0.79    0.74   11.07

----------------------------------------------------------------------------
RDC    sta
----------------------------------------------------------------------------
         AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS      0.69
CAN      0.88    6.33
DEU      0.88    0.97   13.23
DFS      0.86    0.96    0.97    8.65
GBR      0.91    0.96    0.96    0.93    1.33
NOR      0.87    0.93    0.94    0.97    0.92   13.59
NZL      0.90    0.89    0.86    0.90    0.93    0.92    0.50
USA      0.89    0.97    0.95    0.94    0.97    0.91    0.89    2.32
NLD      0.86    0.95    0.97    0.97    0.94    0.95    0.84    0.93    4.83
CAM      0.92    0.90    0.90    0.90    0.90    0.90    0.90    0.90    0.90    6.13
LVA      0.85    0.85    0.85    0.90    0.84    0.89    0.86    0.84    0.86    0.90    0.66

----------------------------------------------------------------------------
RDC    cwi
----------------------------------------------------------------------------
         AUS     CAN     DEU     DFS     GBR     NZL     USA     NLD     CAM     NOR     LVA
AUS      0.40
CAN      0.72    6.78
```

```
DEU     0.70    0.89   11.63
DFS     0.74    0.82    0.89   13.66
GBR     0.83    0.87    0.90    0.88    1.63
NZL     0.77    0.68    0.69    0.68    0.80    0.35
USA     0.66    0.83    0.81    0.83    0.83    0.72    1.41
NLD     0.72    0.92    0.92    0.89    0.91    0.69    0.81    5.50
CAM     0.75    0.79    0.79    0.79    0.79    0.78    0.79    0.79    6.87
NOR     0.79    0.78    0.81    0.90    0.82    0.81    0.81    0.87    0.79   14.42
LVA     0.68    0.69    0.66    0.65    0.66    0.70    0.65    0.67    0.79    0.77    0.29


-----------------------------------------------------------------------------------
RDC     bde
-----------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS     0.50
CAN     0.80    6.03
DEU     0.77    0.87    9.99
DFS     0.79    0.83    0.92   11.89
GBR     0.78    0.86    0.92    0.90    1.60
NOR     0.75    0.80    0.81    0.89    0.83   15.37
NZL     0.78    0.70    0.73    0.73    0.75    0.80    0.35
USA     0.70    0.75    0.90    0.84    0.89    0.82    0.74    1.34
NLD     0.70    0.82    0.90    0.85    0.90    0.86    0.69    0.90    4.89
CAM     0.86    0.82    0.84    0.83    0.83    0.82    0.84    0.83    0.83    5.85
LVA     0.73    0.77    0.80    0.81    0.78    0.81    0.76    0.69    0.75    0.83    0.34


-----------------------------------------------------------------------------------
RDC     ang
-----------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     USA     NLD     CAM     NOR     LVA
AUS     0.44
CAN     0.66    6.81
DEU     0.65    0.61    7.10
DFS     0.68    0.67    0.65    7.14
GBR     0.78    0.81    0.61    0.74    1.34
USA     0.68    0.86    0.61    0.75    0.87    1.27
NLD     0.72    0.82    0.61    0.74    0.83    0.76    5.13
CAM     0.84    0.77    0.79    0.77    0.79    0.79    0.79    7.22
NOR     0.69    0.75    0.76    0.63    0.77    0.77    0.67    0.77   16.08
LVA     0.65    0.63    0.62    0.67    0.63    0.61    0.64    0.77    0.75    0.31


-----------------------------------------------------------------------------------
RDC     ran
-----------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS     0.46
CAN     0.89    5.63
DEU     0.91    0.97    9.09
DFS     0.90    0.95    0.96   10.00
GBR     0.92    0.97    0.97    0.95    1.56
NOR     0.90    0.94    0.90    0.92    0.93   12.16
NZL     0.92    0.91    0.89    0.88    0.92    0.93    0.29
USA     0.89    0.98    0.96    0.94    0.97    0.93    0.90    1.72
NLD     0.90    0.96    0.98    0.96    0.97    0.94    0.88    0.96    5.53
CAM     0.94    0.93    0.93    0.92    0.93    0.93    0.93    0.93    0.92    5.43
LVA     0.89    0.92    0.92    0.91    0.90    0.89    0.89    0.89    0.90    0.92    0.42


-----------------------------------------------------------------------------------
RDC     rwi
-----------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NZL     USA     NLD     CAM     NOR     LVA
AUS     0.48
CAN     0.84    6.50
DEU     0.79    0.94    9.81
DFS     0.80    0.93    0.92   10.48
GBR     0.84    0.92    0.89    0.89    1.47
NZL     0.82    0.88    0.81    0.87    0.91    0.33
USA     0.77    0.90    0.85    0.89    0.93    0.88    1.44
NLD     0.83    0.94    0.95    0.92    0.88    0.83    0.81    6.18
```

```
CAM     0.86    0.87    0.86    0.87    0.87    0.88    0.87    0.87    6.84
NOR     0.82    0.87    0.84    0.94    0.87    0.88    0.87    0.88    0.87   13.90
LVA     0.79    0.81    0.81    0.85    0.78    0.80    0.77    0.81    0.86    0.85    0.41
```

RDC   rls

```
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS     0.23
CAN     0.69    6.60
DEU     0.71    0.95    9.09
DFS     0.68    0.97    0.94    9.28
GBR     0.77    0.77    0.85    0.77    1.54
NOR     0.71    0.87    0.86    0.93    0.79   11.81
NZL     0.67    0.67    0.68    0.67    0.68    0.73    0.12
USA     0.68    0.92    0.93    0.93    0.82    0.83    0.67    1.05
NLD     0.71    0.92    0.93    0.88    0.86    0.80    0.66    0.89    5.31
CAM     0.80    0.80    0.80    0.79    0.80    0.80    0.78    0.81    0.80    6.92
LVA     0.69    0.75    0.79    0.72    0.73    0.70    0.71    0.70    0.79    0.80    0.28
```

RDC   rlr

```
        AUS     CAN     DEU     DFS     NOR     NLD     USA     CAM     LVA
AUS     0.21
CAN     0.58    6.32
DEU     0.60    0.88   10.44
DFS     0.54    0.82    0.90   10.88
NOR     0.57    0.79    0.82    0.84   13.32
NLD     0.58    0.87    0.90    0.88    0.85    4.98
USA     0.56    0.71    0.78    0.66    0.71    0.81    1.05
CAM     0.75    0.72    0.72    0.73    0.71    0.71    0.71    6.84
LVA     0.59    0.67    0.72    0.77    0.64    0.70    0.61    0.72    0.24
```

RDC   fan

```
        AUS     CAN     DEU     DFS     GBR     NOR     USA     NLD     CAM     LVA
AUS     0.29
CAN     0.64    6.66
DEU     0.67    0.81   13.48
DFS     0.62    0.69    0.78    9.33
GBR     0.72    0.78    0.90    0.74    1.60
NOR     0.67    0.75    0.86    0.62    0.77   12.84
USA     0.66    0.82    0.83    0.70    0.83    0.77    1.11
NLD     0.67    0.73    0.88    0.78    0.87    0.73    0.79    5.12
CAM     0.73    0.77    0.77    0.77    0.77    0.77    0.77    0.77    7.67
LVA     0.67    0.65    0.64    0.64    0.64    0.70    0.63    0.65    0.77    0.28
```

RDC   fua

```
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS     0.39
CAN     0.77    5.30
DEU     0.73    0.90   12.58
DFS     0.74    0.78    0.85   11.66
GBR     0.76    0.88    0.94    0.86    1.50
NOR     0.78    0.78    0.78    0.86    0.78   12.09
NZL     0.75    0.82    0.80    0.69    0.79    0.70    0.36
USA     0.75    0.92    0.89    0.85    0.92    0.80    0.85    1.62
NLD     0.74    0.93    0.94    0.83    0.93    0.67    0.84    0.91    4.17
CAM     0.83    0.80    0.79    0.80    0.79    0.80    0.78    0.80    0.79    6.55
LVA     0.67    0.75    0.75    0.79    0.76    0.75    0.73    0.70    0.74    0.77    0.36
```

RDC   ruh

```
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
```

```
AUS      0.48
CAN      0.79   5.66
DEU      0.78   0.87   14.36
DFS      0.79   0.87    0.88   10.72
GBR      0.78   0.75    0.84    0.85    1.43
NOR      0.76   0.84    0.88    0.86    0.82   12.28
NZL      0.82   0.73    0.81    0.76    0.92    0.77    0.33
USA      0.77   0.84    0.90    0.94    0.90    0.84    0.84    1.45
NLD      0.75   0.76    0.92    0.92    0.88    0.90    0.83    0.90    4.05
CAM      0.79   0.81    0.82    0.83    0.82    0.82    0.81    0.82    0.81    6.11
LVA      0.75   0.73    0.75    0.82    0.71    0.74    0.73    0.70    0.75    0.81    0.40

--------------------------------------------------------------------------------
RDC     usu
--------------------------------------------------------------------------------
          AUS    CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM     LVA
AUS      0.34
CAN      0.75   5.93
DEU      0.72   0.90   12.24
DFS      0.65   0.75    0.80   13.02
GBR      0.80   0.78    0.75    0.77    1.95
NOR      0.65   0.70    0.67    0.74    0.76   12.15
NZL      0.63   0.70    0.61    0.59    0.64    0.68    0.33
USA      0.77   0.82    0.75    0.85    0.86    0.78    0.69    1.24
NLD      0.80   0.83    0.80    0.89    0.93    0.74    0.58    0.92    4.27
CAM      0.83   0.77    0.76    0.76    0.78    0.76    0.75    0.77    0.78    5.62
LVA      0.63   0.63    0.62    0.60    0.71    0.66    0.67    0.66    0.66    0.76    0.32

--------------------------------------------------------------------------------
RDC     ude
--------------------------------------------------------------------------------
          AUS    CAN     DEU     DFS     GBR     NOR     USA     NLD     CAM     LVA
AUS      0.56
CAN      0.88   5.69
DEU      0.89   0.97   12.83
DFS      0.88   0.95    0.93   10.69
GBR      0.89   0.96    0.96    0.92    1.76
NOR      0.89   0.91    0.90    0.87    0.92   14.23
USA      0.87   0.97    0.95    0.95    0.96    0.92    1.38
NLD      0.89   0.97    0.98    0.95    0.97    0.88    0.97    4.19
CAM      0.92   0.92    0.92    0.92    0.92    0.92    0.92    0.92    4.51
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   6.09
DEU      0.93   0.97   12.80
DFS      0.88   0.95    0.92   11.93
GBR      0.91   0.93    0.93    0.89    1.52
NOR      0.88   0.92    0.88    0.92    0.91   14.21
NZL      0.90   0.90    0.90    0.87    0.89    0.89    0.26
USA      0.86   0.92    0.90    0.92    0.93    0.91    0.87    1.46
NLD      0.93   0.98    0.98    0.95    0.94    0.91    0.91    0.91    4.34
CAM      0.90   0.91    0.91    0.91    0.91    0.91    0.91    0.91    0.91    6.48
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      0.59
CAN      0.93   5.04
DEU      0.93   0.94   13.99
DFS      0.91   0.90    0.97   10.58
GBR      0.94   0.93    0.97    0.93    1.48
NOR      0.91   0.91    0.92    0.94    0.93   12.57
```

```
USA     0.94    0.93    0.96    0.94    0.97    0.93    1.91
NLD     0.93    0.94    0.98    0.97    0.98    0.95    0.96    5.09
CAM     0.92    0.93    0.93    0.93    0.93    0.93    0.93    0.93    7.35
LVA     0.90    0.90    0.90    0.91    0.89    0.93    0.89    0.90    0.93    0.47
NZL     0.94    0.94    0.93    0.92    0.93    0.93    0.94    0.93    0.93    0.90    0.44


------------------------------------------------------------------------------------
RDC     rtp
------------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     NOR     NZL     NLD     USA     CAM     LVA
AUS     0.38
CAN     0.88    6.00
DEU     0.89    0.96    13.77
DFS     0.87    0.93    0.96    12.29
NOR     0.88    0.89    0.88    0.87    13.13
NZL     0.90    0.95    0.92    0.88    0.89    0.35
NLD     0.90    0.97    0.98    0.96    0.88    0.93    4.99
USA     0.88    0.91    0.95    0.91    0.91    0.89    0.96    1.46
CAM     0.91    0.91    0.91    0.91    0.91    0.91    0.91    0.91    6.16
LVA     0.89    0.89    0.88    0.88    0.88    0.89    0.90    0.87    0.91    0.38


------------------------------------------------------------------------------------
RDC     ocs
------------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS     1.11
CAN     0.64    4.72
DEU     0.53    0.74    20.54
DFS     0.57    0.59    0.70    9.10
GBR     0.65    0.73    0.86    0.73    1.59
NOR     0.51    0.68    0.66    0.82    0.75    16.29
NZL     0.72    0.58    0.61    0.55    0.63    0.65    0.28
USA     0.62    0.76    0.81    0.71    0.86    0.75    0.72    0.58
NLD     0.59    0.72    0.86    0.86    0.88    0.73    0.66    0.87    3.50
CAM     0.74    0.75    0.75    0.76    0.75    0.76    0.72    0.77    0.78    6.18


------------------------------------------------------------------------------------
RDC     ous
------------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS     1.48
CAN     0.71    5.31
DEU     0.75    0.87    17.19
DFS     0.68    0.78    0.81    10.58
GBR     0.83    0.78    0.81    0.71    1.56
NOR     0.72    0.79    0.81    0.80    0.82    13.05
NZL     0.83    0.82    0.78    0.73    0.81    0.75    0.36
USA     0.75    0.88    0.83    0.82    0.85    0.82    0.88    1.06
NLD     0.71    0.89    0.91    0.85    0.78    0.80    0.83    0.87    4.61
CAM     0.85    0.83    0.82    0.82    0.83    0.82    0.85    0.84    0.84    6.52


------------------------------------------------------------------------------------
RDC     ofl
------------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     USA     NLD     CAM
AUS     0.65
CAN     0.37    4.39
DEU     0.41    0.73    16.39
DFS     0.38    0.79    0.78    13.01
GBR     0.53    0.66    0.73    0.64    1.45
NOR     0.46    0.69    0.71    0.58    0.76    12.98
USA     0.58    0.59    0.73    0.61    0.68    0.75    1.43
NLD     0.46    0.66    0.76    0.62    0.73    0.76    0.69    6.73
CAM     0.56    0.75    0.75    0.75    0.75    0.75    0.75    0.75    6.82


----------------------------------------------------------------------------------------------------
^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  122   87  141   42  164  124   28   21
  CHE  106    0  139  358   63  194  380   63   19
  FRA   80  110    0  217   64  111  215   42   15
  ITA  121  312  181    0  100  228  631   82   20
  NLD   34   62   53   80    0   64   92   29   13
  USA  156  159   87  170   52    0  244   32   20
  DEA  104  318  171  546   81  198    0   76   16
  SVN   25   60   42   74   29   26   69    0    7
  GBR   18   17   14   18   11   18   14    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  134   53  141   35  164  122   28   21
  CHE  117    0  121  463   70  260  502   65   19
  FRA   48   91    0  132   45   70  144   43   11
  ITA  121  405  110    0   92  228  595   83   20
  NLD   30   69   41   76    0   50   86   30   13
  USA  156  226   51  170   43    0  226   33   20
  DEA  103  410  112  509   79  173    0   77   15
  SVN   25   61   43   75   30   27   70    0    7
  GBR   18   17   10   18   11   18   14    5    0
-----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  ITA  NLD  DEA  SVN  GBR  USA
-----------------------------------------------------------------------------
  CAN    0  142   87  141   35  124   23   21  164
  CHE  124    0  189  518   74  565   48   19  289
  FRA   80  150    0  217   58  215   37   15  111
  ITA  121  459  181    0   92  631   67   20  228
  NLD   30   72   50   76    0   87   28   13   50
  DEA  104  469  171  546   80    0   60   16  244
  SVN   21   46   38   61   27   56    0    7   24
  GBR   18   17   14   18   11   14    5    0   20
  USA  156  260   87  170   43  198   22   18    0
-----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  NLD  USA  GBR
-----------------------------------------------------------------------------
  CAN    0  141   86   24  163   21
  CHE  124    0  184   53  287   19
  FRA   79  147    0   42  110   15
  NLD   21   54   38    0   35   10
  USA  155  260   86   31    0   20
  GBR   18   17   14    8   18    0
-----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
-----------------------------------------------------------------------------
  CAN    0  142   87  141   42  164  124   28   21
  CHE  124    0  189  518   75  289  565   64   19
  FRA   80  150    0  217   64  111  215   42   15
```

```
  ITA  121  459  181    0  100  228  631   82   20
  NLD   34   72   53   80    0   64   92   29   13
  USA  156  260   87  170   52    0  244   32   20
  DEA  104  469  171  546   81  198    0   76   16
  SVN   25   60   42   74   29   26   69    0    7
  GBR   18   17   14   18   11   18   14    5    0
----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  NLD  USA  DEA  GBR  SVN  ITA
----------------------------------------------------------------------------

  CAN    0  142   53   42  164  124   21   23  137
  CHE  124    0  121   75  289  565   19   48  511
  FRA   48   91    0   45   70  144   11   37  132
  NLD   34   72   41    0   64   92   13   28   98
  USA  156  260   51   52    0  244   20   24  214
  DEA  104  469  113   81  198    0   16   60  625
  GBR   18   17   10   11   18   14    0    7   20
  SVN   21   46   38   27   22   56    5    0   67
  ITA  118  453  110   79  156  538   18   61    0
----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
----------------------------------------------------------------------------

  CAN    0  142   87  141   42  164  124   28   21
  CHE  124    0  189  518   75  289  565   64   19
  FRA   80  150    0  217   64  111  215   42   15
  ITA  121  459  181    0  100  228  631   82   20
  NLD   34   72   53   80    0   64   92   29   13
  USA  156  260   87  170   52    0  244   32   20
  DEA  104  469  171  546   81  198    0   76   16
  SVN   25   60   42   74   29   26   69    0    7
  GBR   18   17   14   18   11   18   14    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  142   87  141   34  164  124   28   21
  CHE  124    0  189  518   73  289  565   64   19
  FRA   80  150    0  217   58  111  215   42   15
  ITA  121  459  181    0   91  228  631   82   20
  NLD   29   71   50   75    0   49   86   29   13
  USA  156  260   87  170   41    0  244   32   20
  DEA  104  469  171  546   79  198    0   76   16
  SVN   25   60   42   74   29   26   69    0    7
  GBR   18   17   14   18   11   18   14    5    0
----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  ITA  NLD  DEA  SVN  USA
----------------------------------------------------------------------------

  CAN    0  142   87  137   34  124   28  164
  CHE  124    0  189  512   73  565   64  289
  FRA   80  150    0  216   58  215   42  111
  ITA  118  454  181    0   90  625   82  214
  NLD   29   71   50   74    0   86   29   49
  DEA  104  469  171  538   79    0   76  244
  SVN   25   60   42   74   29   69    0   32
  USA  156  260   87  156   41  198   26    0
```

BSW
----

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	0	142	53	98	34	164	91	28	21
CHE	124	0	121	347	72	288	371	64	19
FRA	48	91	0	125	43	70	134	42	11
ITA	86	298	103	0	69	130	348	76	17
NLD	29	70	39	62	0	49	72	29	13
USA	156	260	51	97	42	0	144	32	20
DEA	77	302	105	312	67	105	0	75	13
SVN	25	60	42	69	29	26	68	0	7
GBR	18	17	10	15	11	18	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	142	87	141	35	164	124	28	21
CHE	124	0	189	518	72	289	565	65	19
FRA	80	150	0	217	57	111	215	43	15
ITA	121	459	181	0	90	228	631	83	20
NLD	30	70	49	74	0	50	85	30	13
USA	156	260	87	170	43	0	244	33	20
DEA	104	469	171	546	78	198	0	77	16
SVN	25	61	43	75	30	27	70	0	7
GBR	18	17	14	18	11	18	14	5	0

BSW
----

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN
CAN	0	142	87	141	35	164	124	28
CHE	124	0	189	518	72	289	565	65
FRA	80	150	0	217	57	111	215	43
ITA	121	459	181	0	90	228	631	83
NLD	30	70	49	74	0	50	85	30
USA	156	260	87	170	43	0	244	33
DEA	104	469	171	546	78	198	0	77
SVN	25	61	43	75	30	27	70	0

BSW
----

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	0	142	87	141	42	164	124	28	21
CHE	124	0	189	518	73	289	565	64	19
FRA	80	150	0	217	63	111	215	42	15
ITA	121	459	181	0	98	228	631	82	20
NLD	34	70	52	78	0	64	90	29	13
USA	156	260	87	170	52	0	244	32	20
DEA	104	469	171	546	79	198	0	76	16
SVN	25	60	42	74	29	26	69	0	7
GBR	18	17	14	18	11	18	14	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  142   87  141   43  162  124   28   21
 CHE  124    0  189  518   84  289  565   64   19
 FRA   80  150    0  217   67  111  215   42   15
 ITA  121  459  181    0  106  228  631   82   20
 NLD   35   79   55   84    0   66   98   31   13
 USA  155  260   87  170   54    0  244   32   20
 DEA  104  469  171  546   85  198    0   76   16
 SVN   25   60   42   74   30   26   69    0    7
 GBR   18   17   14   18   11   18   14    5    0
--------------------------------------------------------------------------------
BSW
--------

 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  NLD  USA  DEA  SVN  GBR  ITA
--------------------------------------------------------------------------------
 CAN    0  142   87   43  164  113   28   21  129
 CHE  124    0  189   84  289  533   64   19  476
 FRA   80  150    0   67  111  202   42   15  200
 NLD   35   79   55    0   66   92   31   13   96
 USA  156  260   87   54    0  219   32   20  184
 DEA   96  438  161   83  170    0   76   15  537
 SVN   25   60   42   30   26   69    0    7   81
 GBR   18   17   14   11   18   14    5    0   20
 ITA  111  422  167   79  137  473   73   18    0
--------------------------------------------------------------------------------
BSW
--------

 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
--------------------------------------------------------------------------------
 CAN    0  142   87  141   42  164  124   28   21
 CHE  124    0  189  518   73  289  565   64   19
 FRA   80  150    0  217   63  111  215   42   15
 ITA  121  459  181    0   98  226  631   82   20
 NLD   34   70   52   78    0   64   90   29   13
 USA  156  260   87  169   52    0  244   32   20
 DEA  104  469  171  546   79  198    0   76   16
 SVN   25   60   42   74   29   26   69    0    7
 GBR   18   17   14   18   11   18   14    5    0
--------------------------------------------------------------------------------
BSW
--------

 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  ITA  NLD  DEA  SVN  USA
--------------------------------------------------------------------------------
 CAN    0  132   82   96   31   89   28   49
 CHE  118    0  183  345   79  370   64   48
 FRA   74  144    0  148   58  153   42   17
 ITA   84  296  122    0   76  347   76   41
 NLD   27   77   50   68    0   80   31   18
 DEA   76  301  116  312   73    0   75   42
 SVN   25   60   42   69   30   68    0   15
 USA   48   40   12   30   17   35   11    0
--------------------------------------------------------------------------------
BSW
--------

 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
--------------------------------------------------------------------------------
 CAN    0  134   76  141   42  164   91   28   21
 CHE  117    0  151  462   70  260  366   63   19
 FRA   71  118    0  177   55   93  146   41   15
 ITA  121  403  150    0   98  225  384   80   20
 NLD   34   69   49   80    0   64   74   29   13
```

```
 USA  156  226   73  170   52    0  144   32   20
 DEA   77  298  115  346   69  105    0   74   13
 SVN   25   59   41   72   29   26   67    0    7
 GBR   18   17   14   18   11   18   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  134   76  141   42  163  124   28   21
 CHE  117    0  151  463   68  260  510   63   19
 FRA   71  118    0  178   54   93  181   42   15
 ITA  121  405  150    0   98  228  624   81   20
 NLD   34   67   48   78    0   64   90   29   13
 USA  155  226   73  170   52    0  242   32   20
 DEA  103  420  144  542   79  194    0   76   16
 SVN   25   59   42   73   29   26   69    0    7
 GBR   18   17   14   18   11   18   14    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  134   76  137   42  164  124   28   21
 CHE  117    0  151  462   70  260  510   64   19
 FRA   71  118    0  177   55   93  181   42   15
 ITA  118  404  150    0   98  214  619   82   20
 NLD   34   69   49   79    0   64   92   29   13
 USA  156  226   73  156   52    0  242   32   20
 DEA  103  420  144  535   81  194    0   76   16
 SVN   25   60   42   74   29   26   69    0    7
 GBR   18   17   14   18   11   18   14    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  135  124  100   28  165   55
 CHE  118    0  506  347   64  259  121
 DEA  105  418    0  389   75  238  144
 ITA   88  297  337    0   75  130  125
 SVN   26   60   68   68    0   32   41
 USA  156  226  193   97   26    0   70
 FRA   50   91  113  103   41   51    0
 --------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
         CAN  CHE  DEA  ITA  SVN  FRA
 --------------------------------------------------------------------------

 CAN    0  142  126  143   29   89
 CHE  125    0  565  517   64  189
 DEA  105  469    0  629   76  214
 ITA  123  459  545    0   82  215
 SVN   26   61   70   75    0   43
 FRA   82  150  171  180   43    0
 --------------------------------------------------------------------------
BSW
```

```
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  DEA  ITA  SVN  USA  FRA
-----------------------------------------------------------------------------
  CAN     0  135  103  100   28  165   55
  CHE   118    0  402  347   64  259  121
  DEA    89  330    0  356   74  175  136
  ITA    88  297  319    0   75  130  125
  SVN    26   60   67   68    0   32   41
  USA   156  226  132   97   26    0   70
  FRA    50   91  107  103   41   51    0
-----------------------------------------------------------------------------

BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  USA  FRA
-----------------------------------------------------------------------------
  CHE     0  547  347   48  288  188
  DEA   454    0  388   59  229  209
  ITA   298  336    0   60  130  149
  SVN    46   55   55    0   24   36
  USA   260  182   97   22    0  111
  FRA   149  168  123   37   87    0
-----------------------------------------------------------------------------

BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  DEA  ITA  SVN  USA  FRA
-----------------------------------------------------------------------------
  CAN     0   92   76   81   26   95   43
  CHE    79    0  402  347   61  259  121
  DEA    63  330    0  356   70  175  136
  ITA    71  297  319    0   68  130  125
  SVN    24   57   63   61    0   29   41
  USA    87  226  132   97   23    0   70
  FRA    38   91  107  103   41   51    0
-----------------------------------------------------------------------------

BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  CHE  DEA  ITA  SVN  FRA
-----------------------------------------------------------------------------
  CAN     0  142  126  139   29   89
  CHE   125    0  565  511   63  189
  DEA   105  469    0  623   75  214
  ITA   120  454  537    0   81  214
  SVN    26   60   69   74    0   42
  FRA    82  150  171  180   42    0
-----------------------------------------------------------------------------

BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  FRA
-----------------------------------------------------------------------------
  CHE     0  564  515   63  185
  DEA   468    0  629   75  212
  ITA   457  545    0   81  212
  SVN    60   69   74    0   42
  FRA   147  170  179   42    0
-----------------------------------------------------------------------------

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

```
           CHE   DEA   ITA   SVN   FRA
      ----------------------------------------------------------------------------
      CHE     0   337   321    63   136
      DEA   287     0   346    74   153
      ITA   282   312     0    76   146
      SVN    60    68    69     0    42
      FRA   107   116   121    42     0
      ----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
           CHE   DEA   ITA   SVN   FRA
      ----------------------------------------------------------------------------
      CHE     0   564   508    62   185
      DEA   468     0   623    75   212
      ITA   451   537     0    80   211
      SVN    59    69    73     0    42
      FRA   147   170   179    42     0
      ----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
           CHE   DEA   ITA   SVN   FRA
      ----------------------------------------------------------------------------
      CHE     0   370   344    63   116
      DEA   301     0   347    74   132
      ITA   296   312     0    76   123
      SVN    60    68    69     0    42
      FRA    89   104   101    42     0
      ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
           CAN   GBR   USA   AUS
      ----------------------------------------------------------------------------
      CAN     0    26    70    20
      GBR    23     0    82    12
      USA    60    80     0    25
      AUS    21    10    23     0
      ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
           CAN   GBR   USA   AUS
      ----------------------------------------------------------------------------
      CAN     0    26    70    20
      GBR    23     0    82    12
      USA    60    80     0    25
      AUS    21    10    23     0
      ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
           CAN   GBR   USA   AUS
      ----------------------------------------------------------------------------
      CAN     0    26    70    20
      GBR    23     0    82    12
      USA    60    80     0    25
      AUS    21    10    23     0
      ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
```

```
        CAN   GBR   USA   AUS
--------------------------------------------------------------------------------
  CAN     0    26    70    20
  GBR    23     0    82    12
  USA    60    80     0    25
  AUS    21    10    23     0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN   GBR   USA   AUS
--------------------------------------------------------------------------------
  CAN     0    26    70    20
  GBR    23     0    82    12
  USA    60    80     0    25
  AUS    21    10    23     0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN   GBR   USA   AUS
--------------------------------------------------------------------------------
  CAN     0    26    70    20
  GBR    23     0    82    12
  USA    60    80     0    25
  AUS    21    10    23     0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN   GBR   USA   AUS
--------------------------------------------------------------------------------
  CAN     0    26    70    20
  GBR    23     0    82    12
  USA    60    80     0    25
  AUS    21    10    23     0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN   USA   AUS
--------------------------------------------------------------------------------
  CAN     0    43    20
  USA    41     0     9
  AUS    21     8     0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN   GBR   USA   AUS
--------------------------------------------------------------------------------
  CAN     0    26    70    20
  GBR    23     0    82    12
  USA    60    80     0    25
  AUS    21    10    23     0
--------------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN   GBR   USA   AUS
--------------------------------------------------------------------------------
  CAN     0    26    70    20
  GBR    23     0    82    12
```

```
  USA   60   80    0   25
  AUS   21   10   23    0
 ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ---------------------------------------------------------------------------
  CAN    0   26   70   20
  GBR   23    0   82   12
  USA   60   80    0   25
  AUS   21   10   23    0
 ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ---------------------------------------------------------------------------
  CAN    0   26   70   20
  GBR   23    0   82   12
  USA   60   80    0   25
  AUS   21   10   23    0
 ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ---------------------------------------------------------------------------
  CAN    0   26   68   19
  GBR   23    0   82   12
  USA   59   80    0   25
  AUS   20   10   23    0
 ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ---------------------------------------------------------------------------
  CAN    0   26   70   20
  GBR   23    0   82   12
  USA   60   80    0   25
  AUS   21   10   23    0
 ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
 ---------------------------------------------------------------------------
  CAN    0   26   70   20
  GBR   23    0   82   12
  USA   60   80    0   25
  AUS   21   10   23    0
 ---------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  AUS  USA
 ---------------------------------------------------------------------------
  CAN    0   20   70
  AUS   21    0   25
  USA   60   23    0
 ---------------------------------------------------------------------------
GUE
```

```
 --------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
      ---------------------------------------------------------------------------
   CAN    0   12   70   20
   GBR    9    0   34    9
   USA   60   32    0   24
   AUS   21    8   22    0
      ---------------------------------------------------------------------------
 GUE
 --------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
      ---------------------------------------------------------------------------
   CAN    0   24   68   19
   GBR   21    0   80   11
   USA   59   78    0   25
   AUS   20    9   23    0
      ---------------------------------------------------------------------------
 GUE
 --------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
      ---------------------------------------------------------------------------
   CAN    0   24   70   20
   GBR   21    0   80   11
   USA   60   78    0   25
   AUS   21    9   23    0
      ---------------------------------------------------------------------------
 GUE
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 GUE
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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  524  962  487  916  799  672  874  950  649  940 1156  472  616  519  310  596  569  109  443  362  113  585  265
   BEL  458    0  719  559  962  702  637  879  795  674 1099  830  432  628  294  248  452  565  110  426  301  139  611  267
   CAN  895  689    0  907 2192 1227 1418 1488 1746 1892 1483 3507  991 1294  396  376 1231 1192  213  489  788  207 1132  560
   CHE  443  557  810    0 1042  615  593  710  762  742  873  959  391  572  260  218  413  509  105  383  303  123  528  269
   DEU  638  911 1381  891    0 2163 1545 2348 1953 2311 2735 2959 1116 1879  472  372 1227 1719  294  625  624  338 1197  809
   DFS  541  616  917  557 1283    0 1000 1580 1387 1215 1719 1712  744 1181  475  384  825 1103  221  564  482  212  878  454
   ESP  520  617  939  490  880  726    0 1292 1149 1320 1174 1647  762 1018  341  366  883  930  161  442  554  182  920  421
   FRA  630  876 1053  664 1269  902 1004    0 1586 1485 1964 2355  866 1570  518  381 1130 1275  179  583  569  202  976  467
   GBR  819  795 1782  760 1344  969  935 1101    0 1542 1774 2275  832 1265  505  395  944 1105  205  789  568  207 1021  494
   ITA  557  691 1697  678 1588  993  990 1031 1358    0 1526 2469  989 1465  297  296  950 1246  238  477  645  271 1074  614
   NLD  796 1204 1351  859 2045 1274 1011 1319 1520 1368    0 2324  849 1448  663  382  962 1453  254  712  538  240 1078  538
   USA  990  725 3573  892 1696 1075 1125 1318 2097 2132 1904    0 1255 1749  568  467 1774 1694  269  629  961  232 1415  775
   HUN  340  348  887  319  776  543  576  593  669  859  655 1152    0  818  266  279  607  882  149  337  474  149  712  377
   POL  409  502 1006  419 1267  780  690 1008  989 1181 1135 1496  656    0  331  291  794 1198  236  445  558  235  953  563
   NZL  421  229  340  217  329  308  278  307  400  253  593  483  194  209    0  205  336  351   56  352  201   65  326  145
   ZAF  287  212  349  192  293  302  317  368  258  345  495  236  218  186    0  309  303   54  238  232   56  331  138
   JPN  320  258  469  243  378  332  345  352  397  405  391  538  254  285  166  197    0  780  127  352  553  132  653  345
   CZE  373  422  841  367 1152  639  654  833  794  982 1242 1308  749  853  232  225  261    0  180  430  526  209  835  470
   EST   54   65  124   54  176  141   68   87  115  143  167  188   84  136   28   23   36   98    0   79   91   62  143  133
   IRL  405  407  454  374  504  448  417  511  839  441  649  581  272  330  287  226  203  321   39    0  226   94  418  195
   KOR  255  213  724  215  384  316  398  349  430  543  375 1079  368  402  139  179  271  370   37  156    0  109  521  288
   SVN   78  108  159   88  318  163  125  152  152  237  203  182  110  183   48   38   56  149   33   74   68    0  157  112
   PRT  457  612 1149  476  984  765  889  864  933 1075 1071 1474  673  879  256  312  324  690   84  352  448  122    0  460
   LVA  122  152  348  143  628  255  219  241  287  403  344  668  260  386   76   83  103  297   70  109  176   66  365    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  517  962  487  915  798  684  766  950  649  885 1156  472  614  519  260  595  569  108  443  361  113  588  240
 BEL  457    0  713  556  956  695  651  829  788  672 1046  813  429  624  290  217  442  563  110  423  300  139  612  247
 CAN  895  689    0  907 2190 1227 1428 1354 1746 1892 1409 3507  991 1293  396  323 1227 1192  213  489  784  207 1134  534
 CHE  443  556  810    0 1041  615  603  690  762  742  855  959  391  572  260  197  412  509  105  383  302  123  529  249
 DEU  638  911 1381  891    0 2162 1571 2263 1951 2310 2692 2958 1115 1877  471  334 1224 1718  293  624  619  338 1196  780
 DFS  541  615  918  558 1285    0 1023 1448 1385 1215 1641 1711  744 1177  474  330  824 1103  220  562  479  212  880  427
 ESP  531  643  949  502  918  752    0 1251 1173 1332 1168 1667  772 1039  352  321  888  950  165  457  557  186  939  407
 FRA  593  841 1000  643 1227  879 1012    0 1469 1469 1707 2029  839 1498  445  306 1011 1231  174  541  538  201  941  439
 GBR  819  796 1782  760 1344  970  967 1062    0 1542 1708 2273  832 1263  505  339  942 1105  205  786  565  207 1022  466
 ITA  557  691 1697  678 1588  994 1006 1025 1358    0 1518 2468  989 1466  297  287  947 1246  238  477  640  271 1074  605
 NLD  762 1145 1294  836 2016 1252 1014 1191 1467 1362    0 2088  840 1424  637  320  890 1434  251  698  517  240 1060  504
 USA  990  724 3573  892 1696 1075 1143 1174 2097 2132 1660    0 1255 1748  568  398 1770 1694  269  627  955  232 1417  744
 HUN  340  348  887  319  776  544  586  585  669  859  642 1152    0  817  266  261  607  882  149  337  471  149  714  359
 POL  409  502 1006  419 1267  781  714  977  988 1182 1124 1496  656    0  331  265  793 1198  235  445  556  235  955  541
 NZL  421  229  340  217  329  308  286  286  400  253  572  483  194  209    0  168  336  351   56  352  200   65  327  127
 ZAF  246  195  307  176  273  278  300  272  317  255  286  410  230  210  149    0  262  282   53  201  212   56  311  122
 JPN  315  254  462  240  374  328  343  340  390  402  381  529  252  283  165  182    0  779  127  352  549  132  652  326
 CZE  373  422  841  367 1152  640  677  807  794  982 1225 1308  749  853  232  213  259    0  180  430  524  209  837  454
 EST   54   65  124   54  176  141   72   85  115  143  166  188   84  136   28   23   36   98    0   79   91   62  143  127
 IRL  405  407  454  374  504  448  436  494  837  441  635  581  272  330  287  195  202  321   39    0  224   94  419  180
 KOR  255  213  723  215  383  316  403  340  429  541  364 1072  366  401  139  162  267  369   37  156    0  109  519  276
 SVN   78  108  159   88  318  164  130  151  152  237  203  182  110  183   48   38   56  149   33   74   68    0  157  112
 PRT  458  614 1151  476  984  768  912  854  936 1075 1056 1474  675  882  256  300  318  692   84  353  446  122    0  442
 LVA  109  140  333  132  605  241  214  228  268  399  321  646  247  373   66   75   98  289   65   98  173   66  352    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  524  962  487  916  798  674  874  950  649  914 1156  472  616  519  310  596  569  109  443  361  588  113  265
 BEL  458    0  719  559  962  701  640  879  795  674 1076  830  432  628  294  248  452  565  110  426  300  613  139  267
 CAN  895  689    0  907 2192 1227 1421 1487 1746 1892 1452 3507  991 1294  396  376 1229 1192  213  489  786 1134  207  560
 CHE  443  557  810    0 1042  615  594  711  762  742  867  959  391  572  260  218  413  509  105  383  302  529  122  269
 DEU  638  911 1381  891    0 2163 1550 2348 1953 2311 2722 2959 1116 1879  472  372 1227 1719  294  625  622 1197  337  809
 DFS  541  616  918  558 1284    0 1003 1579 1386 1215 1677 1711  744 1180  474  384  825 1103  221  563  480  881  211  454
 ESP  521  620  940  492  887  730    0 1296 1151 1323 1164 1650  763 1022  343  366  883  934  163  443  552  924  182  423
 FRA  630  876 1052  665 1269  902 1009    0 1585 1484 1889 2354  865 1569  518  381 1130 1275  178  583  567  980  200  467
 GBR  819  795 1782  760 1344  970  938 1100    0 1542 1745 2274  832 1265  505  395  944 1105  205  787  567 1024  206  494
 ITA  557  691 1697  678 1588  994  992 1030 1358    0 1523 2469  989 1465  297  296  643 1246  238  477  643 1074  270  614
 NLD  791 1180 1344  858 2043 1274 1013 1297 1508 1367    0 2196  845 1438  650  373  928 1448  253  705  531 1074  238  533
 USA  990  725 3573  892 1696 1075 1127 1317 2097 2132 1862    0 1255 1749  568  467 1772 1694  269  628  958 1417  231  775
 HUN  340  348  887  319  776  544  577  592  669  859  655 1152    0  818  266  279  607  882  149  337  473  714  149  377
 POL  409  502 1006  419 1267  781  693 1007  989 1181 1134 1496  656    0  331  291  794 1198  236  445  557  955  234  563
 NZL  421  229  340  217  329  308  279  307  400  253  591  483  194  209    0  205  336  351   56  352  200  327   65  145
 ZAF  287  212  349  192  293  302  340  317  368  258  343  495  236  218  186    0  309  303   54  238  231  331   55  138
 JPN  317  257  465  242  376  330  343  349  394  404  387  533  252  284  165  196    0  780  127  352  551  653  132  345
 CZE  373  422  841  367 1152  640  657  833  794  982 1241 1308  749  853  232  225  259    0  180  430  526  838  208  470
 EST   54   65  124   54  176  141   69   86  115  143  167  188   84  136   28   23   36   98    0   79   91  143   62  133
 IRL  405  407  454  374  504  448  418  511  837  441  646  581  272  330  287  226  202  321   39    0  225  419   94  195
 KOR  255  213  724  215  384  316  398  349  430  543  372 1075  368  402  139  178  269  370   37  156    0  521  109  288
 PRT  458  613 1151  476  984  768  894  867  935 1075 1069 1474  675  882  256  312  321  692   84  353  448    0  157  460
 SVN   78  108  159   88  318  164  125  150  152  236  201  182  110  183   48   38   56  149   33   74   68  122    0  112
 LVA  122  152  348  143  628  255  221  241  287  403  343  668  260  386   76   83  102  297   70  109  176  365   66    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  PRT  SVN  LVA
     ------------------------------------------------------------------------------------------------------------------
 AUS    0  507  962  470  185  123  687  763  946  647  515 1153  469  606  306  595  569  107  441  361  577  108  265
 BEL  455    0  698  526  230  136  643  816  769  662  693  792  421  602  236  435  555  107  414  296  596  131  263
 CAN  895  684    0  870  529  254 1430 1349 1744 1888 1028 3507  986 1277  371 1227 1192  209  487  784 1117  193  560
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   CHE  438  530  780    0  278  144  595  679  747  726  609  903  383  547  214  410  484  101  379  300  511  114  264
   DEU  154  224  494  242    0  316  350  420  436  663  647  554  264  480   27  182  306  113  124  137  250  162  273
   DFS  110  130  269  133  290    0  190  212  211  305  287  245  151  218   23  119  152   93   77  103  145   68   98
   ESP  533  645  950  499  232  177    0 1258 1176 1334  820 1671  770 1033  368  891  954  166  458  557  927  176  431
   FRA  592  838 1000  635  367  206 1026    0 1465 1458 1066 2019  832 1469  342 1008 1230  168  539  537  918  186  458
   GBR  819  787 1782  750  384  211  974 1060    0 1538 1070 2266  825 1243  388  941 1103  202  777  565 1000  193  493
   ITA  557  687 1697  669  605  295 1010 1022 1358    0 1261 2460  981 1433  291  943 1241  231  472  640 1058  253  611
   NLD  495  754 1058  586  665  283  739  918 1049 1212    0 1229  581 1069  207  519 1025  212  419  377  743  221  428
   USA  989  716 3573  839  498  236 1145 1172 2095 2132 1149    0 1248 1721  461 1770 1693  267  624  954 1390  217  775
   HUN  340  347  887  316  200  117  590  583  668  857  476 1150    0  806  275  606  878  148  333  470  700  143  374
   POL  409  491 1006  399  397  176  723  971  983 1162  948 1495  651    0  286  785 1180  229  437  552  926  214  557
   ZAF  284  209  346  188   20   22  339  295  365  254  186  490  234  215    0  305  298   51  235  228  323   50  136
   JPN  315  254  462  240  109   85  343  340  390  402  308  529  252  283  193    0  779  126  350  549  648  125  345
   CZE  373  422  841  355  228  110  682  807  794  982  995 1308  749  853  221  259    0  177  428  524  823  198  470
   EST   54   64  124   54   72   74   74   85  115  142  149  188   83  134   23   36   98    0   77   91  136   61  132
   IRL  404  404  454  370   98   62  439  494  830  438  414  581  272  327  224  202  321   39    0  224  409   90  195
   KOR  255  213  723  214  104   82  403  340  429  541  288 1071  366  401  177  267  369   37  156    0  518  102  287
   PRT  458  606 1151  466  225  137  914  854  933 1068  759 1473  674  868  308  318  692   82  352  446    0  150  454
   SVN   77  107  158   88  153   51  130  147  151  231  199  181  110  177   34   55  149   33   72   68  120    0  106
   LVA  122  152  348  141  218   42  237  239  287  403  284  668  260  386   82  102  297   70  109  175  365   65    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  524  962  487  916  799  671  874  950  649  940 1156  472  616  519  310  596  569  109  443  362  114  588  265
   BEL  458    0  719  559  962  702  633  879  795  674 1099  830  432  628  294  248  452  565  110  426  301  140  613  267
   CAN  895  689    0  907 2192 1227 1415 1487 1746 1892 1483 3507  991 1294  396  376 1229 1192  213  489  788  208 1134  560
   CHE  443  557  810    0 1042  615  592  710  762  742  873  959  391  572  260  218  413  509  105  383  303  124  529  269
   DEU  638  911 1381  891    0 2163 1536 2347 1953 2311 2735 2959 1116 1879  472  372 1227 1719  294  625  624  339 1197  809
   DFS  541  616  918  558 1284    0  994 1580 1387 1215 1719 1712  744 1181  475  384  825 1103  221  564  482  213  881  454
   ESP  519  612  935  488  870  720    0 1285 1143 1316 1168 1640  761 1015  339  366  879  928  161  441  553  183  920  420
   FRA  630  876 1052  664 1268  901  994    0 1585 1484 1963 2354  865 1569  518  381 1130 1275  178  583  569  202  980  467
   GBR  819  795 1782  760 1344  970  927 1100    0 1542 1774 2275  832 1265  505  395  944 1105  205  789  568  208 1024  494
   ITA  557  691 1697  678 1588  994  983 1030 1358    0 1526 2469  989 1465  297  296  950 1246  238  477  645  272 1074  614
   NLD  796 1204 1351  859 2045 1275 1004 1318 1520 1368    0 2324  849 1448  663  382  962 1453  254  712  538  241 1080  538
   USA  990  725 3573  892 1696 1075 1118 1317 2097 2132 1904    0 1255 1749  568  467 1772 1694  269  629  961  233 1417  775
   HUN  340  348  887  319  776  544  575  592  669  859  655 1152    0  818  266  279  607  882  149  337  474  150  714  377
   POL  409  502 1006  419 1267  781  685 1007  989 1181 1135 1496  656    0  331  291  794 1198  236  445  558  236  955  563
   NZL  421  229  340  217  329  308  276  307  400  253  593  483  194  209    0  205  336  351   56  352  201   65  327  145
   ZAF  287  212  349  192  293  302  339  317  368  258  345  495  236  218  186    0  309  303   54  238  232   57  331  138
   JPN  319  257  466  242  377  331  344  351  396  405  390  535  253  284  165  196    0  780  127  352  552  133  653  345
   CZE  373  422  841  367 1152  640  652  833  794  982 1242 1308  749  853  232  225  261    0  180  430  526  210  838  470
   EST   54   65  124   54  176  141   68   86  115  143  167  188   84  136   28   23   36   98    0   79   91   63  143  133
   IRL  405  407  454  374  504  448  416  511  839  441  649  581  272  330  287  226  202  321   39    0  226   95  419  195
   KOR  255  213  724  215  384  316  396  349  430  543  375 1079  368  402  139  179  270  370   37  156    0  110  521  288
   SVN   79  109  160   89  319  165  126  152  153  238  204  183  111  184   48   38   57  150   33   75   69    0  158  113
   PRT  458  613 1151  476  984  768  887  867  935 1075 1073 1474  675  882  256  312  322  692   84  353  448  122    0  460
   LVA  122  152  348  143  628  255  217  241  287  403  344  668  260  386   76   83  102  297   70  109  176   66  365    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  499  962  487  916  799  671  874  950  649  938 1156  472  616  519  310  402  569  109  443  360  588  113  265
   BEL  455    0  699  552  940  681  617  837  764  672 1011  783  422  616  279  236  342  551  110  411  291  604  139  266
   CAN  895  679    0  907 2192 1227 1417 1487 1746 1892 1480 3507  991 1294  396  489  927 1192  213  489  785 1134  207  560
   CHE  443  553  810    0 1042  615  592  711  762  742  873  959  391  572  260  218  351  509  105  383  301  529  122  269
   DEU  638  905 1381  891    0 2163 1539 2348 1953 2311 2733 2959 1116 1879  472  372  988 1719  294  625  621 1197  337  809
   DFS  541  611  918  558 1284    0  997 1580 1387 1215 1711 1712  744 1181  475  384  597 1103  221  564  479  881  211  454
   ESP  519  608  939  488  875  724    0 1288 1146 1319 1167 1643  762 1016  340  366  700  929  161  441  551  921  182  420
   FRA  630  863 1052  665 1269  902 1000    0 1585 1484 1958 2354  865 1569  518  381  822 1275  178  583  566  980  200  467
   GBR  819  778 1782  760 1344  970  932 1100    0 1542 1771 2275  832 1265  505  395  703 1105  205  789  566 1024  206  494
   ITA  557  691 1697  678 1588  994  988 1030 1358    0 1526 2469  989 1465  297  296  872 1246  238  477  642 1074  270  614
   NLD  796 1108 1351  859 2044 1275 1006 1319 1519 1368    0 2317  849 1447  662  382  716 1453  253  711  533 1079  238  537
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 USA  990  710 3573  892 1696 1075 1123 1317 2097 2132 1901    0 1255 1749  568  467 1251 1694  269  629  956 1417  231  775
 HUN  340  347  887  319  776  544  576  592  669  859  655 1152    0  818  266  279  512  882  149  337  472  714  149  377
 POL  409  499 1006  419 1267  781  688 1007  989 1181 1135 1496  656    0  331  291  690 1198  236  445  556  955  234  563
 NZL  421  223  340  217  329  308  278  307  400  253  593  483  194  209    0  205  223  351   56  352  199  327   65  145
 ZAF  286  209  348  191  292  301  338  316  367  257  344  494  235  217  186    0  211  303   54  238  230  331   55  138
 JPN  276  229  425  223  348  300  300  312  346  392  346  475  235  274  141  151    0  637  115  264  465  530  129  305
 CZE  373  419  841  367 1152  640  653  833  794  982 1242 1308  749  853  232  225  241    0  180  430  525  838  208  470
 EST   54   65  124   54  176  141   68   86  115  143  167  188   84  136   28   23   36   98    0   79   91  143   62  133
 IRL  405  401  454  374  504  448  416  511  839  441  649  581  272  330  287  225  178  321   39    0  224  419   94  195
 KOR  255  213  724  215  384  316  398  349  430  543  375 1075  368  402  139  178  253  370   37  156    0  520  109  287
 PRT  458  609 1151  476  984  768  890  867  935 1075 1072 1474  675  882  256  311  291  692   84  353  448    0  157  460
 SVN   78  108  159   88  318  164  125  150  152  236  201  182  110  183   48   38   56  149   33   74   68  122    0  112
 LVA  122  152  348  143  628  255  217  241  287  403  344  668  260  386   76   83   98  297   70  109  176  365   66    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  524  962  487  916  799  675  874  950  649  940 1156  472  616  519  310  595  569  109  443  360  114  588  265
 BEL  458    0  719  559  962  702  640  879  795  674 1099  830  432  628  294  248  450  565  110  426  299  140  613  267
 CAN  895  689    0  907 2192 1227 1422 1487 1746 1892 1483 3507  991 1294  396  376 1227 1192  213  489  782  208 1134  560
 CHE  443  557  810    0 1042  615  595  710  762  742  873  959  391  572  260  218  412  509  105  383  301  124  529  269
 DEU  638  911 1381  891    0 2163 1553 2347 1953 2311 2735 2959 1116 1879  472  372 1225 1719  294  625  618  339 1197  809
 DFS  541  616  918  558 1284    0 1007 1580 1387 1215 1719 1712  744 1181  475  384  824 1103  221  564  478  213  881  454
 ESP  522  621  941  494  891  733    0 1299 1154 1324 1180 1651  764 1024  344  367  882  936  163  444  552  183  926  424
 FRA  630  876 1052  664 1268  902 1013    0 1585 1484 1963 2354  865 1569  518  381 1128 1275  178  583  564  202  980  467
 GBR  819  795 1782  760 1344  970  941 1100    0 1542 1774 2275  832 1265  505  395  942 1105  205  789  563  208 1024  494
 ITA  557  691 1697  678 1588  994  994 1030 1358    0 1526 2469  989 1465  297  296  948 1246  238  477  638  272 1074  614
 NLD  796 1204 1351  859 2045 1275 1017 1318 1520 1368    0 2324  849 1448  663  382  960 1453  254  712  530  241 1080  538
 USA  990  725 3573  892 1696 1076 1129 1317 2097 2132 1904    0 1255 1749  568  467 1770 1694  269  629  952  233 1417  775
 HUN  340  348  887  319  776  544  579  592  669  859  655 1152    0  818  266  279  607  882  149  337  470  150  714  377
 POL  409  502 1006  419 1267  781  695 1007  989 1181 1135 1496  656    0  331  291  794 1198  236  445  555  236  955  563
 NZL  421  229  340  217  329  308  280  307  400  253  593  483  194  209    0  205  336  351   56  352  199   65  327  145
 ZAF  287  212  349  192  293  302  341  317  368  258  345  495  236  218  186    0  308  303   54  238  231   57  331  138
 JPN  315  254  462  240  374  328  340  345  390  402  384  529  252  283  165  194    0  779  127  352  548  133  652  345
 CZE  373  422  841  367 1152  640  660  833  794  982 1242 1308  749  853  232  225  259    0  180  430  522  210  838  470
 EST   54   65  124   54  176  141   69   86  115  143  167  188   84  136   28   23   36   98    0   79   91   63  143  133
 IRL  405  407  454  374  504  448  419  511  839  441  649  581  272  330  287  226  202  321   39    0  223   95  419  195
 KOR  254  212  722  214  382  316  397  346  428  540  372 1069  366  401  138  178  266  368   37  155    0  109  517  287
 SVN   79  109  160   89  319  165  126  152  153  238  204  183  111  184   48   38   57  150   33   75   68    0  158  113
 PRT  458  614 1151  476  984  768  898  868  937 1076 1074 1475  676  882  256  312  318  693   84  353  445  122    0  460
 LVA  122  152  348  143  628  255  222  241  287  403  344  668  260  386   76   83  102  297   70  109  175   66  365    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  479  881  487  913  798  673  644  947  649  846 1155  468  577  262  557  451  108  428  275  113  586  240
 BEL  448    0  670  541  913  652  609  738  735  669  954  752  413  584  208  407  474  107  389  244  139  594  245
 CAN  840  668    0  884 2127 1131 1355 1214 1652 1886 1345 3313  976 1243  313 1105 1058  210  459  680  207 1111  532
 CHE  443  543  795    0 1041  614  598  657  762  742  846  959  387  554  198  405  443  105  376  254  122  526  249
 DEU  638  888 1378  891    0 2161 1556 2031 1949 2310 2669 2956 1111 1841  336 1196 1514  293  607  544  337 1193  781
 DFS  541  602  915  558 1284    0 1003 1235 1381 1215 1604 1710  739 1127  332  781  913  220  537  390  211  875  427
 ESP  524  611  931  496  900  739    0 1122 1155 1327 1132 1652  763  996  322  849  831  162  434  474  183  931  405
 FRA  528  751  929  602 1163  812  900    0 1258 1432 1497 1685  781 1411  269  862 1044  166  460  456  200  866  422
 GBR  818  759 1709  759 1343  968  950  927    0 1542 1659 2267  826 1219  341  895  949  204  743  476  206 1018  467
 ITA  557  689 1697  678 1588  994  998 1012 1358    0 1518 2468  989 1458  289  944 1208  238  473  597  270 1074  605
 NLD  734 1048 1274  831 2021 1247  985 1106 1443 1364    0 1993  827 1373  316  858 1282  251  649  443  238 1049  504
 USA  990  700 3460  892 1696 1075 1133 1008 2096 2132 1627    0 1249 1698  401 1638 1484  269  601  820  231 1410  744
 HUN  340  341  885  319  776  544  581  550  668  859  646 1152    0  800  261  596  788  149  323  422  149  712  359
 POL  394  485  985  406 1250  757  674  947  966 1178 1100 1466  646    0  252  758 1096  234  407  508  234  929  542
 ZAF  249  194  306  177  274  279  301  242  320  256  287  413  231  202    0  255  241   53  198  166   55  311  122
 JPN  310  253  460  240  374  327  336  325  386  402  378  522  252  277  182    0  668  125  325  461  132  642  324
 CZE  317  366  765  311 1035  560  563  677  682  957 1130 1155  657  797  177  244    0  173  348  450  206  757  440
 EST   54   64  124   54  176  141   69   82  115  143  166  188   84  135   23   36   93    0   77   86   62  142  127
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  IRL  401  392  451  371  502  446  422  424  804  440  619  575  272  316  196  201  265   39    0  169   94  406  176
  KOR  193  187  633  187  344  272  333  308  352  509  315  916  324  379  120  233  322   35  121    0  107  455  261
  SVN   78  108  159   88  318  164  127  150  152  236  201  182  110  183   38   56  148   33   74   67    0  157  112
  PRT  456  603 1129  474  983  766  904  807  935 1076 1050 1471  675  867  300  317  626   83  351  395  122    0  442
  LVA  109  140  333  132  606  241  210  225  268  399  322  646  247  373   75   98  284   65   98  164   66  352    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  497  962  487  652  798  684  871  950  649  904 1156  471  615  310  595  569  109  442  360  113  592  265
  BEL  455    0  697  550  766  677  635  836  763  672 1005  782  422  615  236  428  551  110  410  292  139  606  265
  CAN  895  679    0  907 1808 1227 1428 1478 1746 1892 1438 3507  990 1292  376 1227 1192  213  489  784  207 1135  560
  CHE  443  552  810    0  883  615  603  710  762  741  863  959  391  571  218  412  508  105  383  302  122  529  269
  DEU  526  755 1259  750    0 1564 1299 1759 1505 2160 2131 2255  903 1613  252  912 1354  268  463  526  331  981  749
  DFS  541  611  918  558 1102    0 1023 1561 1385 1214 1664 1710  742 1178  384  824 1103  221  563  480  211  884  454
  ESP  531  635  949  502  750  752    0 1313 1173 1332 1181 1667  771 1037  371  887  949  166  457  556  186  940  428
  FRA  630  864 1052  664 1070  901 1046    0 1577 1484 1848 2335  862 1561  380 1123 1270  177  577  562  200  978  466
  GBR  819  779 1782  760 1135  970  967 1101    0 1542 1730 2272  831 1261  394  941 1105  205  783  566  206 1025  494
  ITA  557  691 1697  678 1505  994 1006 1030 1358    0 1518 2469  989 1464  296  948 1246  238  477  640  270 1073  614
  NLD  786 1106 1338  857 1739 1272 1039 1281 1500 1366    0 2153  839 1424  371  919 1443  253  698  527  238 1071  532
  USA  990  710 3573  892 1439 1075 1143 1310 2097 2132 1846    0 1254 1745  467 1769 1694  269  627  953  231 1417  775
  HUN  340  347  887  319  640  543  586  592  669  859  653 1152    0  817  278  607  881  149  336  469  149  713  377
  POL  409  499 1006  418 1153  780  712 1007  988 1181 1127 1496  655    0  290  794 1195  234  443  554  233  953  562
  ZAF  287  210  349  192  202  302  343  317  368  258  339  495  236  218    0  307  303   54  238  231   55  334  138
  JPN  315  254  462  240  330  328  342  344  389  402  381  528  252  283  193    0  779  127  352  549  132  654  345
  CZE  373  419  841  367  953  640  676  833  794  982 1240 1308  749  853  225  259    0  179  430  524  208  837  470
  EST   54   65  124   54  162  141   72   86  115  143  167  188   84  135   23   36   98    0   79   91   62  142  133
  IRL  404  401  454  374  396  448  436  511  833  441  645  581  272  330  226  202  321   39    0  224   94  419  195
  KOR  254  213  722  215  345  316  400  345  429  541  369 1065  365  400  178  266  369   37  156    0  108  519  287
  SVN   78  108  159   88  318  164  130  150  152  236  201  182  110  183   38   56  149   33   74   67    0  157  112
  PRT  459  612 1152  477  848  769  915  869  940 1076 1070 1477  677  883  312  318  694   83  354  446  122    0  460
  LVA  122  152  348  143  599  255  229  241  287  403  343  668  260  386   83  102  297   70  109  175   66  365    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  517  962  487  916  798  684  843  950  649  882 1156  472  615  519  310  595  569  109  443  361  111  588  265
  BEL  457    0  715  558  958  697  653  866  790  673 1044  815  429  625  290  246  443  563  110  424  300  137  613  267
  CAN  895  689    0  907 2191 1227 1428 1440 1746 1892 1387 3507  991 1294  396  376 1227 1192  213  489  787  205 1134  560
  CHE  443  556  810    0 1042  615  603  709  762  742  849  959  391  572  260  218  412  509  105  383  302  121  529  269
  DEU  638  911 1381  891    0 2163 1572 2335 1953 2311 2676 2959 1116 1878  472  372 1225 1719  294  625  623  335 1197  809
  DFS  541  615  918  558 1285    0 1023 1535 1386 1215 1636 1711  744 1180  474  384  824 1103  221  563  481  210  881  454
  ESP  531  643  949  502  918  752    0 1300 1174 1332 1164 1667  772 1039  352  371  888  949  166  457  558  184  939  428
  FRA  629  873 1048  663 1268  900 1044    0 1556 1481 1812 2246  861 1561  498  373 1089 1267  177  572  558  198  974  464
  GBR  819  796 1782  760 1344  970  967 1096    0 1542 1697 2274  832 1265  505  395  942 1105  205  787  567  204 1024  494
  ITA  557  691 1697  678 1588  994 1006 1029 1358    0 1502 2468  989 1465  297  296  947 1246  238  477  644  268 1074  614
  NLD  759 1143 1271  828 1996 1246 1010 1253 1453 1345    0 2069  835 1419  634  364  890 1429  249  696  520  234 1058  526
  USA  990  724 3573  892 1696 1076 1143 1294 2097 2132 1638    0 1255 1749  568  467 1770 1694  269  628  959  230 1417  775
  HUN  340  348  887  319  776  544  586  592  669  859  637 1152    0  818  266  279  607  882  149  337  474  149  714  377
  POL  409  502 1006  419 1267  781  713 1006  989 1181 1119 1496  656    0  331  291  794 1198  236  445  558  233  955  563
  NZL  421  229  340  217  329  308  286  307  400  253  569  483  194  209    0  205  336  351   56  352  200   64  327  145
  ZAF  287  212  349  192  293  302  343  317  368  258  325  495  236  218  186    0  308  303   54  238  231   55  331  138
  JPN  315  254  462  240  374  328  343  345  390  402  381  529  252  283  165  194    0  779  127  352  550  131  652  345
  CZE  373  422  841  367 1152  640  676  831  794  982 1220 1308  749  853  232  225  259    0  180  430  526  209  838  470
  EST   54   65  124   54  176  141   72   86  115  143  165  188   84  136   28   23   36   98    0   79   91   62  143  133
  IRL  405  407  454  374  504  448  436  508  837  441  632  581  272  330  287  226  202  321   39    0  225   93  419  195
  KOR  255  213  724  215  384  316  403  349  430  543  365 1075  368  402  139  178  267  370   37  156    0  108  521  288
  SVN   77  107  158   88  315  163  129  150  151  235  200  181  110  183   47   37   55  149   33   73   68    0  155  111
  PRT  458  614 1151  476  984  768  912  866  936 1075 1055 1474  675  882  256  312  318  692   84  353  448  121    0  460
  LVA  122  152  348  143  628  255  229  241  287  403  340  668  260  386   76   83  102  297   70  109  176   65  365    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  517  962  487  916  752  676  871  950  649  911 1156  472  616  519  310  596  569  109  443  361  113  587  265
  BEL  457    0  715  558  958  686  640  869  789  673 1057  815  429  625  290  246  444  563  110  424  300  139  612  267
  CAN  895  689    0  907 2192 1149 1424 1478 1746 1892 1430 3507  991 1294  396  376 1228 1192  213  489  787  207 1132  560
  CHE  443  556  810    0 1042  611  598  710  762  742  861  959  391  572  260  218  412  509  105  383  302  123  529  269
  DEU  638  911 1381  891    0 2109 1556 2342 1953 2311 2704 2959 1116 1879  472  372 1226 1719  294  625  623  338 1195  809
  DFS  541  615  918  558 1284    0  966 1495 1327 1214 1638 1618  736 1160  447  357  771 1069  219  546  468  212  871  450
  ESP  522  623  943  496  893  734    0 1295 1157 1325 1165 1654  766 1027  345  369  885  937  163  445  555  182  926  425
  FRA  630  875 1052  664 1268  902 1016    0 1578 1484 1879 2335  863 1567  515  380 1125 1270  178  578  566  201  976  466
  GBR  819  794 1781  760 1343  969  941 1098    0 1542 1733 2274  832 1265  505  395  943 1105  205  787  567  207 1022  494
  ITA  557  691 1697  678 1588  993  995 1030 1357    0 1507 2469  989 1465  297  296  949 1246  238  477  644  271 1074  614
  NLD  788 1173 1320  850 2023 1269 1014 1293 1492 1350    0 2175  840 1432  647  373  927 1443  251  703  532  237 1071  530
  USA  990  724 3573  892 1696 1075 1131 1310 2097 2132 1840    0 1255 1749  568  467 1771 1694  269  628  960  232 1415  775
  HUN  340  348  887  319  776  544  581  592  669  859  650 1152    0  818  266  279  607  882  149  337  474  149  714  377
  POL  409  502 1006  419 1267  781  698 1007  989 1181 1127 1496  656    0  331  291  794 1198  236  445  558  235  953  563
  NZL  421  229  340  217  329  308  280  307  400  253  588  483  194  209    0  205  336  351   56  352  200   65  327  145
  ZAF  287  212  349  192  293  302  342  317  368  258  343  495  236  218  186    0  309  303   54  238  231   56  330  138
  JPN  315  255  463  240  375  329  342  346  391  403  384  530  252  283  165  195    0  780  127  352  551  132  653  345
  CZE  373  422  841  367 1152  640  661  833  794  982 1236 1308  749  853  232  225  259    0  180  430  526  209  837  470
  EST   54   65  124   54  176  141   69   86  115  143  166  188   84  136   28   23   36   98    0   79   91   62  142  133
  IRL  405  407  454  374  504  448  420  511  837  441  644  581  272  330  287  226  202  321   39    0  225   94  419  195
  KOR  255  213  724  215  384  316  400  349  430  543  372 1076  368  402  139  179  268  370   37  156    0  109  521  288
  SVN   78  108  159   88  318  164  125  151  152  237  201  182  110  183   48   38   56  149   33   74   68    0  157  112
  PRT  458  613 1151  476  984  765  898  867  935 1075 1068 1474  675  882  256  312  319  692   84  353  448  122    0  460
  LVA  122  152  348  143  628  255  223  241  287  403  343  668  260  386   76   83  102  297   70  109  176   66  365    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  517  962  487  916  799  687  874  950  649  937 1156  472  616  519  310  595  569  109  443  360  114  588  265
  BEL  457    0  715  558  958  698  655  872  790  673 1066  815  429  625  290  246  443  563  110  424  299  140  613  267
  CAN  895  689    0  907 2192 1227 1430 1487 1746 1892 1461 3507  991 1294  396  376 1227 1192  213  489  782  208 1134  560
  CHE  443  556  810    0 1042  615  603  710  762  742  867  959  391  572  260  218  412  509  105  383  301  124  529  269
  DEU  638  911 1381  891    0 2163 1582 2347 1953 2311 2717 2959 1116 1879  472  372 1225 1719  294  625  618  339 1197  809
  DFS  541  615  919  558 1285    0 1029 1580 1387 1215 1714 1712  744 1181  475  384  824 1103  221  564  478  213  881  454
  ESP  532  646  950  502  934  759    0 1329 1180 1337 1209 1672  774 1047  355  371  891  954  167  459  556  188  943  431
  FRA  630  876 1052  664 1268  902 1062    0 1586 1484 1960 2354  865 1569  518  381 1128 1275  178  583  564  202  980  467
  GBR  819  796 1782  760 1344  970  974 1101    0 1542 1763 2275  832 1265  505  395  942 1105  205  789  563  208 1024  494
  ITA  557  691 1697  678 1588  994 1010 1030 1358    0 1510 2469  989 1465  297  296  948 1246  238  477  638  272 1074  614
  NLD  793 1181 1327  851 2025 1270 1054 1316 1506 1351    0 2303  844 1442  660  382  960 1448  252  710  530  238 1078  535
  USA  990  724 3573  892 1696 1077 1145 1317 2097 2132 1882    0 1255 1749  568  467 1770 1694  269  629  951  233 1417  775
  HUN  340  348  887  319  776  544  589  592  669  859  650 1152    0  818  266  279  607  882  149  337  470  150  714  377
  POL  409  502 1006  419 1267  781  722 1007  989 1181 1128 1496  656    0  331  291  794 1198  236  445  555  236  955  563
  NZL  421  229  340  217  329  308  288  307  400  253  590  483  194  209    0  205  336  351   56  352  199   65  327  145
  ZAF  287  212  349  192  293  303  343  317  368  258  345  495  236  218  186    0  308  303   54  238  231   57  331  138
  JPN  315  254  462  240  374  328  343  345  390  402  384  529  252  283  165  194    0  779  127  352  548  133  652  345
  CZE  373  422  841  367 1152  640  680  833  794  982 1237 1308  749  853  232  225  259    0  180  430  522  210  838  470
  EST   54   65  124   54  176  141   73   86  115  143  166  188   84  136   28   23   36   98    0   79   91   63  143  133
  IRL  405  407  454  374  504  448  438  511  839  441  647  581  272  330  287  226  202  321   39    0  223   95  419  195
  KOR  254  212  722  214  382  316  401  346  428  540  372 1068  366  401  138  178  266  368   37  155    0  109  517  287
  SVN   79  109  160   89  319  165  132  152  153  238  202  183  111  184   48   38   57  150   33   75   68    0  158  113
  PRT  458  614 1151  476  984  768  916  868  937 1076 1073 1475  676  882  256  312  318  693   84  353  445  122    0  460
  LVA  122  152  348  143  628  255  237  241  287  403  344  668  260  386   76   83  102  297   70  109  175   66  365    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  521  962  487  916  799  673  874  950  649  947 1156  472  616  310  596  569  109  442  361  114  588  265
  BEL  456    0  716  557  957  698  637  873  790  674 1100  825  431  626  245  449  564  110  421  298  140  613  267
  CAN  895  685    0  907 2192 1227 1420 1487 1746 1892 1551 3507  991 1294  376 1229 1192  213  489  786  208 1134  560
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CHE  443  555  810    0 1042  615  593  710  762  742  888  959  391  572  218  413  509  105  383  302  124  529  269
DEU  638  910 1381  891    0 2163 1547 2347 1953 2311 2797 2959 1116 1879  372 1227 1719  294  625  622  339 1197  809
DFS  541  615  919  558 1284    0 1002 1580 1387 1215 1737 1712  744 1181  384  825 1103  221  564  480  213  881  454
ESP  520  616  939  490  882  728    0 1294 1151 1322 1199 1648  763 1021  366  883  933  163  443  552  183  924  423
FRA  630  874 1052  664 1268  902 1005    0 1585 1484 1991 2354  865 1569  381 1130 1275  178  583  567  202  980  467
GBR  819  791 1782  760 1344  970  936 1100    0 1542 1819 2275  832 1265  395  944 1105  205  786  567  208 1024  494
ITA  557  691 1697  678 1588  994  990 1030 1358    0 1591 2470  990 1466  296  950 1246  238  477  643  272 1074  614
NLD  804 1204 1426  872 2117 1290 1025 1339 1564 1439    0 2395  871 1485  383  969 1484  262  717  544  248 1100  553
USA  990  721 3573  892 1696 1077 1125 1317 2097 2132 1979    0 1255 1750  467 1772 1694  269  629  958  233 1417  775
HUN  340  348  887  319  776  544  577  592  669  859  671 1152    0  819  279  607  882  149  337  473  150  714  377
POL  409  502 1006  419 1267  781  692 1007  989 1182 1171 1496  657    0  291  794 1198  236  445  557  236  955  563
ZAF  287  212  349  192  293  303  339  317  368  258  346  495  236  218    0  309  303   54  238  231   57  331  138
JPN  319  257  466  242  377  331  344  351  396  405  394  535  253  284  196    0  780  127  352  551  133  653  345
CZE  373  422  841  367 1152  640  656  833  794  982 1265 1308  749  853  225  261    0  180  430  526  210  838  470
EST   54   65  124   54  176  141   69   86  115  143  172  188   84  136   23   36   98    0   79   91   63  143  133
IRL  404  406  454  374  504  448  417  511  836  441  653  581  272  330  226  202  321   39    0  225   95  419  195
KOR  255  213  724  215  384  316  398  349  430  543  383 1076  368  402  179  270  370   37  156    0  110  521  288
SVN   79  109  160   89  319  165  126  152  153  238  210  183  111  184   38   57  150   33   75   69    0  158  113
PRT  458  613 1151  476  984  768  893  867  935 1075 1086 1474  675  882  312  322  692   84  353  448  122    0  460
LVA  122  152  348  143  628  255  220  241  287  403  354  668  260  386   83  102  297   70  109  176   66  365    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  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT  LVA
--------------------------------------------------------------------------------
AUS    0  517  962  487  916  799  676  874  950  649  947 1156  472  616  519  310  596  569  108  443  361  112  588  240
BEL  457    0  715  558  958  698  640  871  789  673 1077  815  429  625  290  246  445  563  110  424  300  138  613  247
CAN  895  689    0  907 2192 1227 1423 1487 1746 1892 1551 3507  991 1294  396  376 1229 1192  213  489  787  205 1134  534
CHE  443  556  810    0 1042  615  597  710  762  742  888  959  391  572  260  218  413  509  105  383  302  121  529  249
DEU  638  911 1381  891    0 2163 1555 2347 1953 2311 2797 2959 1116 1880  472  372 1227 1719  293  625  623  335 1197  780
DFS  541  615  919  558 1284    0 1007 1580 1387 1215 1737 1712  744 1181  475  384  825 1103  220  564  481  210  881  428
ESP  522  623  942  495  892  733    0 1301 1156 1324 1205 1653  765 1026  345  368  884  936  162  444  554  181  927  403
FRA  630  875 1052  664 1268  902 1015    0 1585 1484 1991 2354  865 1569  518  381 1130 1275  177  583  568  198  980  444
GBR  819  795 1782  760 1344  970  942 1100    0 1542 1819 2275  832 1265  505  395  944 1105  205  789  567  204 1024  466
ITA  557  691 1697  678 1588  994  994 1030 1358    0 1591 2470  990 1467  297  296  950 1246  238  477  644  269 1074  605
NLD  804 1192 1426  872 2117 1290 1031 1339 1564 1439    0 2395  871 1485  664  383  969 1484  261  717  546  244 1100  521
USA  990  724 3573  892 1696 1076 1130 1317 2097 2132 1979    0 1255 1751  568  467 1772 1694  269  629  960  230 1417  744
HUN  340  348  887  319  776  544  580  592  669  859  671 1152    0  819  266  279  607  882  149  337  474  150  714  359
POL  409  502 1006  419 1267  781  697 1007  989 1183 1171 1496  657    0  331  291  794 1198  235  445  558  234  955  541
NZL  421  229  340  217  329  308  280  307  400  253  594  483  194  209    0  205  336  351   56  352  200   64  327  127
ZAF  287  212  349  192  293  303  341  317  368  258  346  495  236  218  186    0  309  303   54  238  231   56  331  124
JPN  317  257  465  242  376  330  343  349  394  404  392  533  252  284  165  196    0  780  127  352  551  132  653  326
CZE  373  422  841  367 1152  640  660  833  794  982 1265 1308  749  853  232  225  259    0  180  430  526  209  838  454
EST   54   65  124   54  176  141   69   86  115  143  172  188   84  136   28   23   36   98    0   79   91   63  143  127
IRL  405  407  454  374  504  448  419  511  839  441  653  581  272  330  287  226  202  321   39    0  225   94  419  180
KOR  255  213  724  215  384  316  399  349  430  543  383 1076  368  402  139  179  269  370   37  156    0  109  521  277
SVN   78  108  159   89  315  163  125  150  152  236  209  182  111  184   47   37   56  150   33   74   69    0  156  112
PRT  458  613 1151  476  984  768  897  867  935 1075 1086 1474  675  882  256  312  321  692   84  353  448  121    0  442
LVA  109  140  333  132  605  241  208  229  268  399  332  646  247  373   66   75   98  289   65   98  174   65  352    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  NZL
--------------------------------------------------------------------------------
AUS    0  524  962  487  916  799  673  874  950  649  937 1156  472  616  310  588  569  109  442  362  112  588  265   71
BEL  458    0  719  559  962  702  640  879  795  674 1095  830  432  628  248  451  565  110  426  301  138  613  267   54
CAN  895  689    0  907 2192 1227 1421 1487 1746 1892 1461 3507  991 1294  376 1229 1192  213  489  788  205 1134  560   83
CHE  443  557  810    0 1042  615  594  710  762  742  867  959  391  572  218  413  509  105  383  303  121  529  269   58
DEU  638  911 1381  891    0 2163 1548 2347 1953 2311 2717 2959 1116 1880  372 1225 1719  294  625  624  335 1197  809   91
DFS  541  616  919  558 1284    0 1003 1580 1387 1215 1714 1712  744 1181  384  819 1103  221  564  482  210  881  454   63
ESP  520  619  940  491  884  729    0 1295 1151 1323 1173 1649  763 1022  366  873  934  163  443  554  181  924  423   70
FRA  630  876 1052  664 1268  902 1006    0 1585 1484 1959 2354  865 1569  381 1123 1275  178  583  569  198  980  467   65
GBR  819  795 1782  760 1344  970  937 1100    0 1542 1762 2275  832 1265  395  939 1105  205  786  568  204 1024  494   80
ITA  557  691 1697  678 1588  994  991 1030 1358    0 1510 2469  989 1466  296  950 1246  238  477  645  269 1074  614   82
NLD  793 1202 1327  851 2025 1270 1011 1315 1505 1351    0 2303  844 1442  382  956 1448  252  710  538  234 1078  535  126
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   USA  990  725 3573  892 1696 1077 1126 1317 2097 2132 1882    0 1255 1750  467 1752 1694  269  629  961  230 1417  775   85
   HUN  340  348  887  319  776  544  577  592  669  859  650 1152    0  818  279  606  882  149  337  474  150  714  377   52
   POL  409  502 1006  419 1267  781  693 1007  989 1182 1128 1496  656    0  291  792 1198  236  445  558  234  955  563   64
   ZAF  287  212  349  192  293  303  339  317  368  258  345  495  236  218    0  306  303   54  238  232   56  331  138   20
   JPN  317  257  465  242  376  330  343  349  394  404  388  533  252  284  196    0  779  126  350  552  132  653  345   60
   CZE  373  422  841  367 1152  640  657  833  794  982 1237 1308  749  853  225  259    0  180  430  526  209  838  470   66
   EST   54   65  124   54  176  141   69   86  115  143  166  188   84  136   23   36   98    0   79   91   63  143  133   23
   IRL  404  407  454  374  504  448  418  511  836  441  647  581  272  330  226  202  321   39    0  226   94  419  195   53
   KOR  255  213  724  215  384  316  398  349  430  543  375 1079  368  402  179  269  370   37  156    0  109  521  288   54
   SVN   78  108  159   89  315  163  125  150  152  236  201  182  111  184   37   56  150   33   74   69    0  156  112   30
   PRT  458  613 1151  476  984  768  894  867  935 1075 1072 1474  675  882  312  321  692   84  353  448  121    0  460   61
   LVA  122  152  348  143  628  255  221  241  287  403  344  668  260  386   83  102  297   70  109  176   65  365    0   32
   NZL   75   49   82   50   83   57   63   60   77   74  121   88   38   48   21   54   52   11   45   46   19   59   16    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  POL  NZL  JPN  CZE  EST  IRL  KOR  SVN  PRT  ZAF  HUN  LVA
  -------------------------------------------------------------------------------
   AUS    0  511  961  469  911  674  678  872  814  648  792  876  512  512  401  450  108  376  239  112  500  169  346  265
   BEL  456    0  708  532  947  642  642  859  710  673  966  711  541  286  343  479  110  365  218  138  540  145  336  267
   CAN  894  684    0  870 2184 1070 1424 1487 1567 1890 1401 3092 1192  391  927 1062  212  424  607  205 1012  227  851  560
   CHE  438  532  780    0  952  572  591  696  717  727  770  872  498  255  350  429  104  340  228  120  464  133  317  264
   DEU  637  909 1380  835    0 2013 1557 2339 1791 2308 2647 2631 1745  462  987 1511  293  552  485  335 1077  223  912  809
   DFS  502  577  888  517 1238    0  903 1374 1141 1197 1518 1314 1024  386  584  888  214  450  333  210  753  212  573  441
   ESP  523  628  944  493  898  687    0 1308 1047 1326 1110 1482  930  346  703  830  162  376  423  182  827  218  627  426
   FRA  630  872 1052  650 1266  845 1027    0 1316 1482 1651 1746 1410  509  822 1089  176  470  420  198  846  212  692  466
   GBR  731  730 1626  704 1284  866  834  972    0 1518 1521 1900 1119  398  687  922  193  596  416  203  875  221  654  478
   ITA  557  691 1697  669 1587  982  998 1030 1350    0 1572 2421 1431  295  872 1208  237  461  540  269 1028  229  922  614
   NLD  710 1051 1312  763 2051 1193  956 1202 1334 1428    0 1784 1325  540  715 1296  255  580  399  244  943  213  695  537
   USA  819  685 3301  813 1614  976 1024 1079 1876 2124 1533    0 1557  394 1211 1433  259  502  716  230 1207  257 1014  754
   POL  351  438  948  355 1171  701  607  910  895 1154 1063 1375    0  253  667 1063  223  361  460  232  843  188  693  537
   NZL  418  227  338  214  328  277  282  306  332  253  496  355  165    0  221  261   55  287  129   64  257  101  169  144
   JPN  276  229  425  223  348  299  301  312  346  392  350  475  261  141    0  610  114  247  394  129  512  165  460  305
   CZE  317  366  765  302 1034  556  563  691  675  957 1147 1139  777  182  237    0  172  336  397  207  722  203  707  448
   EST   54   65  124   54  176  138   69   86  112  143  168  185  127   28   36   93    0   72   82   63  134   46  137  133
   IRL  358  368  413  337  472  387  368  433  610  433  558  506  278  244  178  264   39    0  144   94  345  126  246  187
   KOR  179  168  568  170  313  237  294  277  309  459  289  812  345   97  212  282   34  105    0  108  392  128  357  240
   SVN   78  108  159   89  315  163  127  150  152  236  209  182  184   47   56  149   33   74   69    0  156   54  147  112
   PRT  394  535 1004  412  893  652  776  748  789 1027  921 1260  790  204  280  596   78  293  346  121    0  212  570  438
   ZAF  161  132  211  111  182  187  192  187  196  201  185  262  161   92  124  154   21  119   89   36  203    0  170  105
   HUN  266  272  778  258  639  436  458  478  527  795  541  956  572  128  212  599   77  208  273  110  547  151    0  343
   LVA  122  152  348  141  628  254  225  240  283  403  348  657  371   76   98  287   70  109  151   65  346   65  233    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  JPN  CZE  EST  IRL  KOR  SVN  PRT
  -------------------------------------------------------------------------------
   AUS    0  524  962  487  914  799  673  770  950  649  940 1152  472  615  519  596  569  108  443  362  113  588
   BEL  458    0  717  557  960  700  644  835  794  673 1098  824  432  627  294  451  565  110  425  301  138  612
   CAN  895  689    0  907 2191 1227 1414 1360 1746 1892 1483 3486  991 1293  396 1229 1192  213  489  790  206 1133
   CHE  443  557  810    0 1040  615  598  695  762  742  873  953  391  572  260  413  509  105  383  303  121  529
   DEU  638  910 1381  891    0 2162 1557 2270 1952 2310 2734 2946 1115 1878  470 1225 1718  293  624  623  335 1195
   DFS  541  616  918  557 1283    0 1006 1453 1387 1215 1719 1709  744 1179  475  825 1103  220  563  483  209  880
   ESP  524  630  944  496  900  738    0 1245 1159 1327 1190 1649  768 1031  350  881  941  162  450  557  183  934
   FRA  600  845 1011  652 1235  881 1001    0 1476 1471 1758 2033  842 1502  447 1017 1232  175  544  543  199  941
   GBR  819  796 1782  760 1344  969  951 1074    0 1542 1775 2268  832 1264  505  944 1105  205  788  568  205 1022
   ITA  557  691 1697  678 1588  993  998 1027 1358    0 1526 2464  989 1465  297  950 1246  238  477  646  269 1074
   NLD  796 1205 1351  859 2045 1274 1030 1230 1521 1368    0 2317  849 1447  663  962 1453  253  712  538  236 1080
   USA  985  722 3539  885 1686 1071 1130 1191 2088 2125 1896    0 1252 1743  567 1768 1688  268  626  963  230 1413
   HUN  340  348  887  319  776  543  581  590  669  859  655 1150    0  817  266  607  882  149  337  474  149  713
   POL  409  502 1006  419 1267  780  702  979  989 1181 1135 1491  656    0  331  793 1198  235  445  558  234  955
   NZL  421  229  340  217  329  308  283  291  400  253  593  481  194  209    0  336  351   56  352  202   65  327
   JPN  317  256  464  242  376  330  343  346  394  404  388  533  252  284  165    0  780  127  352  553  132  653
   CZE  373  422  841  367 1152  639  665  811  794  982 1242 1302  749  853  232  260    0  180  430  526  206  837
   EST   54   65  124   54  176  141   69   86  115  143  167  188   84  136   28   36   98    0   79   91   62  143
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IRL  405  407  454  374  504  448  426  498  839  441  649  580  272  330  287  202  321   39    0  226   94  419
KOR  255  213  724  215  384  316  401  341  430  543  375 1077  368  402  139  269  370   37  156    0  109  521
SVN   78  107  159   88  316  161  127  149  152  235  200  182  110  183   48   56  148   33   74   68    0  157
PRT  458  613 1151  476  984  767  904  854  935 1075 1073 1466  675  882  256  320  692   84  353  448  122    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	524	962	487	915	799	679	874	950	649	937	1156	472	616	519	596	569	108	430	112	588
BEL	458	0	719	559	962	702	648	880	796	674	1096	830	432	628	294	452	565	110	415	137	613
CAN	895	689	0	907	2192	1227	1425	1488	1746	1892	1461	3507	991	1294	396	1229	1192	213	475	205	1133
CHE	443	557	810	0	1041	615	599	710	762	742	867	959	391	572	260	413	509	105	376	121	529
DEU	638	911	1381	891	0	2163	1561	2348	1953	2311	2717	2958	1116	1879	471	1226	1719	293	609	334	1196
DFS	541	616	919	558	1284	0	1013	1580	1387	1215	1714	1712	744	1181	475	825	1103	220	540	209	881
ESP	524	630	944	496	900	739	0	1311	1165	1327	1189	1660	768	1033	351	887	942	162	437	182	934
FRA	630	877	1053	664	1269	902	1028	0	1587	1485	1961	2355	866	1570	518	1130	1275	178	555	198	980
GBR	819	794	1781	760	1342	969	948	1100	0	1542	1763	2275	832	1265	505	944	1105	205	751	204	1024
ITA	557	691	1697	678	1588	994	998	1031	1357	0	1510	2469	989	1465	297	950	1246	238	474	268	1074
NLD	793	1203	1327	851	2025	1270	1027	1317	1504	1351	0	2303	844	1442	660	962	1448	251	674	232	1078
USA	990	725	3573	892	1696	1077	1136	1318	2097	2132	1882	0	1255	1749	568	1772	1694	269	603	230	1416
HUN	340	348	887	319	776	544	581	593	669	859	650	1152	0	818	266	607	882	149	327	150	713
POL	409	502	1006	419	1267	781	702	1008	989	1181	1128	1496	656	0	331	794	1198	235	434	234	955
NZL	421	229	340	217	329	308	284	307	400	253	590	483	194	209	0	336	351	56	338	64	327
JPN	317	256	464	242	376	330	343	349	394	404	388	533	252	284	165	0	780	127	338	132	653
CZE	373	422	841	367	1152	640	665	833	793	982	1237	1308	749	853	232	260	0	180	415	208	838
EST	54	65	124	54	176	141	69	87	115	143	166	188	84	136	28	36	98	0	78	63	143
IRL	403	406	453	372	502	447	423	504	815	441	639	575	272	330	283	202	320	39	0	94	408
SVN	78	107	159	89	314	162	127	150	152	235	199	182	111	184	47	56	149	33	74	0	156
PRT	458	614	1151	476	984	768	905	867	935	1075	1073	1474	675	882	256	320	692	84	353	121	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	516	962	487	914	799	681	766	950	649	920	1154	472	614	587	569	108	429	113	592
BEL	457	0	712	554	954	695	646	829	787	672	1053	808	428	622	438	562	110	412	138	612
CAN	895	688	0	907	2191	1227	1427	1354	1746	1892	1452	3499	991	1293	1213	1192	213	475	206	1137
CHE	443	554	810	0	1040	615	601	690	762	742	864	957	391	572	411	509	105	376	121	530
DEU	638	910	1381	891	0	2162	1564	2263	1952	2310	2709	2957	1116	1878	1220	1718	293	608	335	1199
DFS	541	614	919	558	1284	0	1017	1449	1387	1215	1691	1698	744	1179	814	1103	220	540	209	886
ESP	526	637	946	499	906	744	0	1242	1167	1329	1179	1658	769	1035	876	944	164	438	184	939
FRA	593	841	1000	643	1227	879	998	0	1470	1469	1731	2022	839	1499	1005	1231	174	531	198	943
GBR	819	793	1781	760	1342	969	954	1060	0	1542	1750	2268	832	1264	932	1105	205	748	205	1026
ITA	557	691	1697	678	1588	994	1002	1025	1357	0	1522	2468	990	1466	949	1246	238	474	269	1074
NLD	770	1148	1304	838	2018	1253	1008	1195	1481	1363	0	2214	844	1436	924	1442	252	670	236	1071
USA	986	720	3573	892	1695	1077	1137	1174	2096	2132	1694	0	1256	1748	1719	1692	269	601	230	1421
HUN	340	348	887	319	776	544	583	585	669	859	642	1152	0	818	607	882	149	327	149	714
POL	409	501	1006	419	1267	781	705	977	989	1181	1127	1496	657	0	792	1198	235	434	234	956
JPN	315	255	463	240	375	329	343	341	391	403	383	530	252	283	0	777	126	334	132	654
CZE	373	421	841	367	1152	640	668	807	793	982	1225	1307	749	853	259	0	180	415	206	838
EST	54	65	124	54	176	141	71	85	115	143	166	188	84	136	36	98	0	78	62	143
IRL	402	406	453	372	502	447	425	492	812	441	631	575	272	330	202	320	39	0	94	409
SVN	78	107	159	88	316	162	128	148	152	235	200	182	110	183	56	148	33	74	0	157
PRT	459	615	1153	477	987	771	912	858	941	1076	1061	1476	677	884	319	694	84	354	122	0

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

	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	CZE	IRL	KOR	SVN	PRT	EST	HUN	POL
BEL	0	668	466	791	649	587	785	732	632	899	751	466	387	203	111	528	77	334	381
CAN	668	0	795	1863	1131	1310	1321	1651	1800	1264	3311	1042	459	541	174	997	158	850	831
CHE	466	704	0	838	526	507	610	661	675	681	815	404	315	204	97	439	74	309	342

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   DEU  771 1263  713     0 1709 1333 1859 1595 2039 2202 2396 1372  493  427  258  966  211  871 1156
   DFS  598  916  471 1137    0  925 1445 1376 1107 1459 1692  894  537  302  162  750  159  576  717
   ESP  584  875  401  759  695     0 1178 1066 1237 1035 1528  819  400  382  155  806  120  622  684
   FRA  815  996  550 1076  878  943    0 1466 1331 1513 2019 1062  530  374  155  828  122  691  998
   GBR  757 1708  631 1153  967  848 1061    0 1443 1482 2259  932  742  371  171  881  151  660  798
   ITA  658 1638  620 1453  939  946  978 1294    0 1378 2281 1123  431  480  216  968  186  884 1014
   NLD  978 1204  660 1755 1172  879 1112 1290 1280    0 1737 1228  589  352  188  894  180  663  879
   USA  700 3459  734 1468 1076 1000 1174 2094 2033 1430    0 1454  600  632  196 1226  186 1026 1077
   CZE  362  754  284  963  546  563  677  668  894 1095 1130    0  338  346  173  702  126  702  770
   IRL  392  450  298  412  447  383  492  806  413  562  575  257    0  132   79  343   52  247  263
   KOR  159  522  155  290  222  273  256  283  417  263  726  248   98    0   88  350   58  322  335
   SVN   90  136   71  243  130  111  119  133  192  165  159  127   63   59    0  134   48  127  178
   PRT  526  998  389  834  647  757  740  780  969  879 1257  577  290  313  103    0   97  565  609
   EST   42   93   34  117  100   45   56   87  101  112  117   65   24   24   22   52    0  107  151
   HUN  270  772  250  619  434  455  475  522  777  519  950  590  206  246   96  540   55    0  545
   POL  295  650  240  754  477  435  616  627  796  668  864  524  205  232  142  550   76  443    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  510  761  302  630  720  636  941  736  424  282  356  210  555  401  585  135   88  289  217  461
   CHE  514    0  919  247  597  734  732  820  929  411  302  336  227  774  371  567  122   93  284  208  448
   DEU  740  783    0  802 1667 1603 2166 2266 2412 1310  796  445  469 1718  827 1342  333  254  791  294 1512
   DFS  241  201  368    0  495  625  528  788  686  437  220  276  133  322  273  419   83   61  225  195  420
   FRA  636  542 1050  259    0 1058 1325 1264 1420  888  632  355  390 1044  627 1011  197  144  601  232 1175
   GBR  743  722 1168  353  822    0 1520 1634 2224  865  579  679  414 1349  687 1094  206  178  593  364 1012
   ITA  655  668 1480  363  959 1336    0 1477 2428 1141  775  425  535 1743  849 1299  268  219  838  261 1316
   NLD 1024  806 1804  503  995 1414 1330    0 1949 1190  574  579  385 1122  706 1085  238  218  593  484 1145
   USA  672  862 1486  343  909 2084 2096 1574    0 1358 1016  555  715 2682  985 1581  231  223  940  365 1434
   CZE  329  289  939  231  604  626  902 1061 1075    0  511  287  387  912  566  762  205  151  620  207  949
   JPN  190  192  309  107  273  303  356  305  422  214    0  184  371  740  393  603  123   94  397  155  567
   IRL  362  332  385  206  343  740  401  551  537  218  137    0  131  352  227  383   88   58  199  243  285
   KOR  158  169  311   78  275  308  455  279  813  276  209   96    0  574  364  419  107   76  343  122  447
   CAN  576  713 1262  247  853 1454 1616 1154 3032  708  378  365  553    0  785 1123  204  178  752  236 1041
   PRT  395  324  721  198  584  605  850  679 1049  466  236  191  318  804    0  637  153  114  479  177  701
   ESP  589  465  754  275  818  897  977  938 1076  515  264  378  292  817  586    0  183  139  566  249  827
   SVN  104   88  318   56  149  152  232  201  182  148   55   68   67  159  116  126    0   60  144   63  227
   EST   54   48  154   26   75  105  133  149  152   84   34   31   34  117   71   62   33    0  124   44  203
   HUN  232  223  572  148  430  476  728  465  879  524  187  162  265  723  466  410  108   71    0  137  632
   NZL  184  184  248  127  195  307  233  447  321  153  118  204   95  237  153  214   46   24  108    0  176
   POL  376  327 1066  255  814  830 1074  930 1301  702  238  232  338  915  670  546  180  120  534  137    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  162   95  107   35  159  268  138   18   18
   CAN  168    0  112  150   37   82  485  150   17   25
   DFS   72  100    0  118   47   99  178  130   24   34
   GBR  105  155  114    0   43   81  187  116   18   36
   ITA   35   35   46   41    0   33   47   47   10   16
   NZL  161   83   78   83   30    0  164  107   19   21
   USA  264  489  146  194   50  170    0  263   39   39
   ZAF  142  150  113  114   48  103  270    0   28   26
   NLD   14   12   18   15    7   16   39   23    0    4
   CHE   16   23   33   34   17   19   39   25    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  162   95  107   35  159  268  131   18   25
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   CAN  168    0  112  150   37   82  485  139   17   30
   DFS   72  100    0  118   47   99  178  121   24   44
   GBR  105  155  114    0   43   81  187  111   18   43
   ITA   35   35   46   41    0   33   47   47   10   23
   NZL  161   83   78   83   30    0  164   98   19   27
   USA  264  489  146  194   50  170    0  241   39   46
   ZAF  136  141  107  110   48   95  250    0   28   38
   NLD   14   12   18   15    7   16   39   23    0    8
   CHE   23   29   43   42   24   25   47   37    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  162   95  107   35  159  131   18  268   29
   CAN  168    0  112  150   37   82  139   17  485   34
   DFS   72  100    0  118   47   99  121   24  178   47
   GBR  105  155  114    0   43   81  111   18  187   46
   ITA   35   35   46   41    0   33   47   10   47   26
   NZL  161   83   78   83   30    0   98   19  164   31
   ZAF  136  141  107  110   48   95    0   28  241   42
   NLD   14   12   18   15    7   16   23    0   39   10
   USA  264  489  146  194   50  170  250   39    0   50
   CHE   26   31   46   45   26   29   40    7   51    0
  ------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  USA  ZAF  NLD  CHE
  ------------------------------------------------------------------------
   AUS    0  162   13  106   35  267  137    6   29
   CAN  168    0   36  150   37  485  150    9   34
   DFS   13   36    0   34    2   43   23    8    9
   GBR  104  155   34    0   42  185  113   12   44
   ITA   35   35    2   40    0   46   46    5   26
   USA  263  489   41  192   49    0  260   22   50
   ZAF  141  150   23  111   48  267    0   13   41
   NLD    3    7    8   10    4   20   11    0    5
   CHE   26   31    9   43   26   51   39    5    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  162   95  107   35  159  268  138   18   29
   CAN  168    0  112  150   37   82  485  150   17   34
   DFS   72  100    0  118   47   99  178  130   24   47
   GBR  105  155  114    0   43   81  187  116   18   46
   ITA   35   35   46   41    0   33   47   47   10   26
   NZL  161   83   78   83   30    0  164  107   19   31
   USA  264  489  146  194   50  170    0  263   39   50
   ZAF  142  150  113  114   48  103  270    0   28   42
   NLD   14   12   18   15    7   16   39   23    0   10
   CHE   26   31   46   45   26   29   51   40    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  162   90  107   35  159  268  138   18   29
   CAN  168    0  101  150   37   82  485  150   17   34
   DFS   64   86    0  114   44   92  167  123   22   46
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   GBR  105  155  107    0   43   81  187  116   18   46
   ITA   35   35   41   41    0   33   47   47   10   26
   NZL  161   83   70   83   30    0  164  107   19   31
   USA  264  489  132  194   50  170    0  263   39   50
   ZAF  142  150  103  114   48  103  270    0   28   42
   NLD   14   12   16   15    7   16   39   23    0   10
   CHE   26   31   45   45   26   29   51   40    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  162   95  107   35  159  268  138   18   29
   CAN  168    0  112  150   37   82  485  150   17   34
   DFS   72  100    0  118   47   99  178  130   24   47
   GBR  105  155  114    0   43   81  187  116   18   46
   ITA   35   35   46   41    0   33   47   47   10   26
   NZL  161   83   78   83   30    0  164  107   19   31
   USA  264  489  146  194   50  170    0  263   39   50
   ZAF  142  150  113  114   48  103  270    0   28   42
   NLD   14   12   18   15    7   16   39   23    0   10
   CHE   26   31   46   45   26   29   51   40    7    0
  ----------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  ITA  ZAF  NLD  USA  CHE
  ----------------------------------------------------------------------------
   AUS    0  162   87   35  109   18  267   29
   CAN  168    0  101   37  125   17  485   34
   DFS   62   86    0   44   93   22  166   46
   ITA   35   35   41    0   44   10   47   26
   ZAF  111  121   79   44    0   25  205   42
   NLD   14   12   16    7   18    0   39   10
   USA  263  489  131   50  203   39    0   50
   CHE   26   31   45   26   40    7   51    0
  ----------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  USA  ZAF  NLD  CHE
  ----------------------------------------------------------------------------
   AUS    0  162   92  106   35  267  137   18   29
   CAN  168    0  112  150   37  485  150   17   34
   DFS   70  100    0  116   47  177  129   24   47
   GBR  104  155  112    0   43  186  116   18   46
   ITA   35   35   46   41    0   47   47   10   26
   USA  263  489  145  193   50    0  262   39   50
   ZAF  141  150  112  114   48  269    0   28   42
   NLD   14   12   18   15    7   39   23    0   10
   CHE   26   31   46   45   26   51   40    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  162   95  107   35  159  268  138   18   29
   CAN  168    0  112  150   37   82  485  150   16   34
   DFS   72  100    0  118   47   99  178  130   23   47
   GBR  105  155  114    0   43   81  187  116   18   46
   ITA   35   35   46   41    0   33   47   47   10   26
   NZL  161   83   78   83   30    0  164  107   19   31
   USA  264  489  146  194   50  170    0  263   39   50
```

```
  ZAF   142  150  113  114   48  103  270    0   28   42
  NLD    14   11   17   15    7   16   39   23    0   10
  CHE    26   31   46   45   26   29   51   40    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  162   87  107   35  159  268  138   18   29
  CAN  168    0   95  150   37   82  485  150   16   34
  DFS   62   84    0  105   44   85  159  118   21   46
  GBR  105  155  103    0   43   81  187  116   18   46
  ITA   35   35   41   41    0   33   47   47   10   26
  NZL  161   83   65   83   30    0  164  107   19   31
  USA  264  489  126  194   50  170    0  263   39   50
  ZAF  142  150  101  114   48  103  270    0   28   42
  NLD   14   11   15   15    7   16   39   23    0   10
  CHE   26   31   45   45   26   29   51   40    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  162   95  107   35  159  268  138   18   29
  CAN  168    0  112  150   37   82  485  150   16   34
  DFS   72  100    0  118   47   99  178  130   23   47
  GBR  105  155  114    0   43   81  187  116   18   46
  ITA   35   35   46   41    0   33   47   47   10   26
  NZL  161   83   78   83   30    0  164  107   19   31
  USA  264  489  146  194   50  170    0  263   39   50
  ZAF  142  150  113  114   48  103  270    0   28   42
  NLD   14   11   17   15    7   16   39   23    0   10
  CHE   26   31   46   45   26   29   51   40    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  162   93  106   35  267  138   20   29
  CAN  168    0  112  150   37  482  150   19   34
  DFS   71  100    0  116   47  177  130   37   47
  GBR  104  154  112    0   43  186  116   23   46
  ITA   35   35   46   41    0   47   47   10   26
  USA  263  487  145  193   50    0  262   46   50
  ZAF  142  150  113  114   48  269    0   34   42
  NLD   16   14   31   20    7   45   29    0   12
  CHE   26   31   46   45   26   51   40    9    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  162   95  107   35  159  268  138   20   29
  CAN  168    0  112  150   37   82  485  150   19   34
  DFS   72  100    0  118   46   99  178  130   37   47
  GBR  105  155  114    0   43   81  187  116   23   46
  ITA   35   35   45   41    0   33   46   47   10   26
  NZL  161   83   78   83   30    0  164  107   22   31
  USA  264  489  146  194   49  170    0  263   46   50
  ZAF  142  150  113  114   48  103  270    0   34   42
  NLD   16   14   31   20    7   19   45   29    0   12
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   CHE   26   31   46   45   26   29   51   40    9    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  162   92  106   35  267  130   18   29   25
   CAN  168    0  112  150   37  485  139   16   34   18
   DFS   70  100    0  116   47  177  120   23   47   22
   GBR  104  155  112    0   43  186  111   18   46   17
   ITA   35   35   46   41    0   47   47   10   26    3
   USA  263  489  145  193   50    0  241   39   50   25
   ZAF  135  141  106  110   48  250    0   28   42   17
   NLD   14   11   17   15    7   39   23    0   10    5
   CHE   26   31   46   45   26   51   40    7    0    7
   NZL   25   17   21   16    1   23   15    3    6    0
------------------------------------------------------------------------------

JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  NZL  ZAF  NLD  USA  CHE
------------------------------------------------------------------------------
   AUS    0  162   79  159  128   20  268   29
   CAN  168    0   90   82  136   19  485   34
   DFS   57   81    0   78  105   35  149   46
   NZL  161   83   60    0   94   22  163   31
   ZAF  131  135   89   87    0   34  236   42
   NLD   16   14   29   19   29    0   46   12
   USA  264  489  118  169  237   45    0   50
   CHE   26   31   45   29   40    9   51    0
------------------------------------------------------------------------------

JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  ITA  NZL  USA  NLD  CHE
------------------------------------------------------------------------------
   AUS    0  162   95   35   35  159  268   18   25
   CAN  168    0  112   37   37   82  485   17   30
   DFS   72  100    0   32   47   99  178   24   44
   GBR   40   43   30    0   12   35   40    4    3
   ITA   35   35   46   13    0   33   47   10   23
   NZL  161   83   78   39   30    0  164   19   27
   USA  264  489  146   43   50  170    0   39   46
   NLD   14   12   18    5    7   16   39    0    8
   CHE   23   29   43    4   24   25   47    6    0
------------------------------------------------------------------------------

JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DFS  GBR  NZL  USA  NLD  CHE  ITA
------------------------------------------------------------------------------
   AUS    0  162   92  107  159  268   18   25   35
   CAN  168    0  106  150   82  482   16   30   37
   DFS   70   98    0  108   91  169   23   44   46
   GBR  105  154  109    0   78  186   18   43   43
   NZL  161   83   72   80    0  163   19   27   33
   USA  264  487  139  193  169    0   39   46   46
   NLD   14   11   17   15   16   39    0    8   10
   CHE   23   29   43   42   25   47    6    0   23
   ITA   35   35   45   41   30   49    7   24    0
------------------------------------------------------------------------------

JER
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 common bulls below diagonal
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```
common three quarter sib group above diagonal
        CAN  DFS  GBR  ITA  USA  NLD  CHE
-----------------------------------------------------------------------------
 CAN    0   112  150   37  485   17   30
 DFS  100     0  116   47  177   24   44
 GBR  154   112    0   43  185   18   43
 ITA   35    46   41    0   47   10   23
 USA  489   145  192   50    0   39   46
 NLD   12    18   15    7   39    0    8
 CHE   29    43   42   24   47    6    0
-----------------------------------------------------------------------------
JER
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JER
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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   27   14   56   12   18   26   16   11    5   19
 CAN   27    0   11  150   79    5   38  158    4    0   10
 DEU   14   11    0   61    4   12   13    4   14    0   32
 DFS   44  151   52    0   61   89   65   85   36    0  130
 GBR   10   78    4   56    0    0   30   65    1    0    3
 NOR   14    5   11   69    0    0    7    0   26    0   13
 NZL   25   36   12   63   27    6    0   28    5    2    8
 USA   16  152    4   82   61    0   27    0    2    0    4
 NLD   11    4   13   35    1   25    5    2    0    0   12
 CAM    5    0    0    0    0    0    2    0    0    0    0
 LVA   18   10   25   91    3   11    8    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   27   14   56   12   26   16   11    5   11   18
 CAN   27    0   11  150   79   38  158    4    0    3   10
 DEU   14   11    0   61    4   13    4   14    0    6   30
 DFS   44  151   52    0   61   63   85   34    0   56  111
 GBR   10   78    4   56    0   30   65    1    0    0    3
 NZL   25   36   12   61   27    0   28    5    2    4    7
 USA   16  152    4   82   61   27    0    2    0    0    4
 NLD   11    4   13   33    1    5    2    0    0   16   11
 CAM    5    0    0    0    0    2    0    0    0    0    0
 NOR   10    2    5   43    0    4    0   15    0    0    3
 LVA   17   10   23   76    3    7    4   10    0    2    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   27   14   56   12   11   26   16   11    5   19
 CAN   27    0   11  150   79    2   38  156    4    0   10
 DEU   14   11    0   61    4    7   13    4   14    0   32
 DFS   44  151   52    0   61   65   63   85   34    0  130
 GBR   10   78    4   56    0    0   30   64    1    0    3
 NOR   10    2    6   49    0    0    4    0   21    0    4
 NZL   25   36   12   61   27    4    0   28    5    2    8
 USA   16  151    4   82   60    0   27    0    2    0    4
 NLD   11    4   13   33    1   20    5    2    0    0   12
 CAM    5    0    0    0    0    0    2    0    0    0    0
 LVA   18   10   25   91    3    3    8    4   11    0    0
-----------------------------------------------------------------------------
```

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RDC
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 common bulls below diagonal
 common three quarter sib group above diagonal
      AUS  CAN  DEU  DFS  GBR  USA  NLD  CAM  NOR  LVA
-----------------------------------------------------------------------------

 AUS    0   27    4   19   12   16   11    5   12   19
 CAN   27    0    0   50   79  158    4    0    4   10
 DEU    4    0    0   19    0    0    2    0    3    4
 DFS   19   51   19    0   22   19   14    0   46   16
 GBR   10   78    0   20    0   65    1    0    0    3
 USA   16  152    0   19   61    0    2    0    0    4
 NLD   11    4    2   14    1    2    0    0   16   11
 CAM    5    0    0    0    0    0    0    0    0    0
 NOR   11    3    3   46    0    0   15    0    0    5
 LVA   18   10    2   14    3    4   10    0    4    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   27   14   56   12   20   26   16   11    5   19
 CAN   27    0   11  150   79    5   38  158    4    0   10
 DEU   14   11    0   61    4   12   13    4   14    0   32
 DFS   44  151   52    0   61   99   62   85   35    0  130
 GBR   10   78    4   56    0    0   30   65    1    0    3
 NOR   16    5   11   77    0    0    8    0   26    0   14
 NZL   25   36   12   58   27    7    0   28    5    2    8
 USA   16  152    4   82   61    0   27    0    2    0    4
 NLD   11    4   13   34    1   25    5    2    0    0   12
 CAM    5    0    0    0    0    0    2    0    0    0    0
 LVA   18   10   25   91    3   12    8    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   27   14   56   12   26   16   11    5   11   19
 CAN   27    0   11  150   79   38  158    4    0    2   10
 DEU   14   11    0   61    4   13    4   14    0    6   32
 DFS   44  151   52    0   61   63   85   35    0   53  130
 GBR   10   78    4   56    0   30   65    1    0    0    3
 NZL   25   36   12   61   27    0   28    5    2    4    8
 USA   16  152    4   82   61   27    0    2    0    0    4
 NLD   11    4   13   34    1    5    2    0    0   16   12
 CAM    5    0    0    0    0    2    0    0    0    0    0
 NOR   10    2    5   40    0    4    0   15    0    0    3
 LVA   18   10   25   91    3    8    4   11    0    2    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   27   14   56   12   20   26   16   11    5   19
 CAN   27    0   11  150   79    5   38  158    4    0   10
 DEU   14   11    0   61    4   12   13    4   14    0   32
 DFS   44  151   52    0   61  102   65   85   36    0  130
 GBR   10   78    4   56    0    0   30   65    1    0    3
 NOR   16    5   11   79    0    0    8    0   26    0   14
 NZL   25   36   12   63   27    7    0   28    5    2    8
 USA   16  152    4   82   61    0   27    0    2    0    4
 NLD   11    4   13   35    1   25    5    2    0    0   12
 CAM    5    0    0    0    0    0    2    0    0    0    0
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```
    LVA   18   10   25   91    3   12    8    4   11    0    0
   -------------------------------------------------------------------------------
RDC
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   common bulls below diagonal
   common three quarter sib group above diagonal
         AUS  CAN  DEU  DFS  NOR  NLD  USA  CAM  LVA
   -------------------------------------------------------------------------------
    AUS    0   27   14   56   20   11   16    5   18
    CAN   27    0   11  149    5    4  158    0   10
    DEU   14   11    0   61   12   14    4    0   30
    DFS   44  150   52    0   99   33   85    0  111
    NOR   16    5   11   77    0   26    0    0   12
    NLD   11    4   13   32   25    0    2    0   11
    USA   16  152    4   82    0    2    0    0    4
    CAM    5    0    0    0    0    0    0    0    0
    LVA   17   10   23   76   10   10    4    0    0
   -------------------------------------------------------------------------------
RDC
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   common bulls below diagonal
   common three quarter sib group above diagonal
         AUS  CAN  DEU  DFS  GBR  NOR  USA  NLD  CAM  LVA
   -------------------------------------------------------------------------------
    AUS    0   27   11   56   12   20   16   11    5   19
    CAN   27    0    9  150   79    5  158    4    0   10
    DEU   11    9    0   52    4   11    4   14    0   19
    DFS   44  151   46    0   61   99   85   34    0  130
    GBR   10   78    4   56    0    0   65    1    0    3
    NOR   16    5   10   77    0    0    0   26    0   14
    USA   16  152    4   82   61    0    2    0    0    4
    NLD   11    4   13   33    1   25    2    0    0   12
    CAM    5    0    0    0    0    0    0    0    0    0
    LVA   18   10   15   91    3   12    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   27   14   56   12   20   26   16   11    5   19
    CAN   27    0   11  150   79    5   38  158    4    0   10
    DEU   14   11    0   61    4   12   13    4   14    0   32
    DFS   44  151   52    0   61  102   65   85   34    0  130
    GBR   10   78    4   56    0    0   30   65    1    0    3
    NOR   16    5   11   79    0    0    8    0   26    0   14
    NZL   25   36   12   63   27    7    0   28    5    2    8
    USA   16  152    4   82   61    0   27    0    2    0    4
    NLD   11    4   13   33    1   25    5    2    0    0   12
    CAM    5    0    0    0    0    0    2    0    0    0    0
    LVA   18   10   25   91    3   12    8    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   27   14   56   12   20   26   16   11    5   19
    CAN   27    0   11  150   79    5   38  158    4    0   10
    DEU   14   11    0   61    4   12   13    4   14    0   32
    DFS   44  151   52    0   61   99   63   85   34    0  124
    GBR   10   78    4   56    0    0   30   65    1    0    3
    NOR   16    5   11   77    0    0    8    0   26    0   14
    NZL   25   36   12   60   27    7    0   28    5    2    8
    USA   16  152    4   82   61    0   27    0    2    0    4
    NLD   11    4   13   33    1   25    5    2    0    0   12
    CAM    5    0    0    0    0    0    2    0    0    0    0
```

```
   LVA   18   10   25   87    3   12    8    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   27   14   56   12   20   26   16   11    5   19
   CAN   27    0   11  150   79    5   38  158    4    0   10
   DEU   14   11    0   61    4   13   13    4   14    0   32
   DFS   44  151   52    0   61   94   65   85   36    0  130
   GBR   10   78    4   56    0    0   30   65    1    0    3
   NOR   16    5   12   74    0    0    8    0   26    0   14
   NZL   25   36   12   63   27    7    0   28    5    2    8
   USA   16  152    4   82   61    0   27    0    2    0    4
   NLD   11    4   13   35    1   25    5    2    0    0   12
   CAM    5    0    0    0    0    0    2    0    0    0    0
   LVA   18   10   25   91    3   12    8    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   27   14   56   12   20   16   13    5   19
   CAN   27    0   11  150   79    5  155    4    0   10
   DEU   14   11    0   61    4   12    4   16    0   32
   DFS   44  151   52    0   61  102   85   45    0  130
   GBR   10   78    4   56    0    0   65    1    0    3
   NOR   16    5   11   79    0    0    0   33    0   14
   USA   16  151    4   82   61    0    2    0    0    4
   NLD   13    4   15   44    1   32    2    0    0   15
   CAM    5    0    0    0    0    0    0    0    0    0
   LVA   18   10   25   91    3   12    4   14    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   27   14   56   12   20   26   16   13    5   18
   CAN   27    0   11  150   79    5   38  158    4    0   10
   DEU   14   11    0   61    4   13   13    4   16    0   30
   DFS   44  151   52    0   61  101   63   85   44    0  111
   GBR   10   78    4   56    0    0   30   65    1    0    3
   NOR   16    5   12   79    0    0    8    0   33    0   13
   NZL   25   36   12   61   27    7    0   28    7    2    7
   USA   16  152    4   82   61    0   27    0    2    0    4
   NLD   13    4   15   43    1   32    7    2    0    0   14
   CAM    5    0    0    0    0    0    2    0    0    0    0
   LVA   17   10   23   76    3   11    7    4   13    0    0
---------------------------------------------------------------------------
RDC
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 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  CAN  DEU  DFS  GBR  NOR  USA  NLD  CAM  LVA  NZL
---------------------------------------------------------------------------
   AUS    0   27   14   56   12   20   16   11    5   19    6
   CAN   27    0   11  150   79    5  156    4    0   10    6
   DEU   14   11    0   61    4   12    4   14    0   32    6
   DFS   44  151   52    0   61   96   85   36    0  130   14
   GBR   10   78    4   56    0    0   64    1    0    3    6
   NOR   16    5   11   74    0    0    0   26    0   14    2
   USA   16  151    4   82   60    0    0    2    0    4    6
   NLD   11    4   13   35    1   25    2    0    0   12    3
```

```
     CAM    5    0    0    0    0    0    0    0    0    0    0
     LVA   18   10   25   91    3   12    4   11    0    0    2
     NZL    6    6    5   14    6    2    6    3    0    2    0
     ------------------------------------------------------------------------
RDC
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 common bulls below diagonal
 common three quarter sib group above diagonal
         AUS  CAN  DEU  DFS  NOR  NZL  NLD  USA  CAM  LVA
     ------------------------------------------------------------------------
     AUS    0   27   14   51   20   26   13   16    5   19
     CAN   27    0   11  144    5   38    4  158    0   10
     DEU   14   11    0   58   13   13   16    4    0   32
     DFS   41  144   52    0   93   58   42   80    0  113
     NOR   16    5   12   74    0    8   33    0    0   14
     NZL   25   36   12   57    7    0    6   28    2    8
     NLD   13    4   15   41   32    6    0    2    0   14
     USA   16  152    4   78    0   27    2    0    0    4
     CAM    5    0    0    0    0    2    0    0    0    0
     LVA   18   10   25   79   12    8   13    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   27   14   56   11   22   26   16   11    5
     CAN   27    0   11  150   76    7   38  158    4    0
     DEU   14   11    0   61    4   15   13    4   14    0
     DFS   44  151   52    0   61  123   65   85   36    0
     GBR    9   75    4   56    0    0   27   63    1    0
     NOR   18    6   14  101    0    0   10    0   27    0
     NZL   25   36   12   63   24    9    0   28    5    2
     USA   16  152    4   82   59    0   27    0    2    0
     NLD   11    4   13   35    1   26    5    2    0    0
     CAM    5    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   27   14   56   11   20   26   16   11    5
     CAN   27    0   11  150   76    5   38  155    4    0
     DEU   14   11    0   61    4   12   13    4   14    0
     DFS   44  151   52    0   61  102   65   85   36    0
     GBR    9   75    4   56    0    0   27   63    1    0
     NOR   16    5   11   79    0    0    8    0   26    0
     NZL   25   36   12   63   24    7    0   28    5    2
     USA   16  151    4   82   59    0   27    0    2    0
     NLD   11    4   13   35    1   25    5    2    0    0
     CAM    5    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   27   14   56   11   20   16   11    5
     CAN   27    0   11  150   76    5  158    4    0
     DEU   14   11    0   61    4   12    4   14    0
     DFS   44  151   52    0   61  102   85   36    0
     GBR    9   75    4   56    0    0   63    1    0
     NOR   16    5   11   79    0    0    0   26    0
     USA   16  152    4   82   59    0    0    2    0
     NLD   11    4   13   35    1   25    2    0    0
```

```
  CAM      5     0     0     0     0     0     0     0     0
  ---------------------------------------------------------------------
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