Notes and Comments on MRSCAL

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MRSCAL (MetRic SCALing) provides internal analysis of:

1. **two-way, one-mode *data* in a symmetric (lower-triangular) matrix of dis/similarities**
2. **by means of a Minkowski (default: Euclidean) distance *model***
3. **using an linear and/or log-interval / power (metric) *transformation* of the data.**

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1. MRSCAL (Roskam 1972) implements the basic metric distance model of multidimensional scaling, sometimes referred to as "classic multidimensional scaling", though this differs from the original "classic" methods by using iterative methods. It has proved to be a remarkably robust and effective program. It is part of the "MINI" series, but is more in the Guttman-Lingoes traditions, using their measures of fit, rather than Kruskal's stress.

This program has several important features:

The simple option to input similarity or dissimilarity data (an irritating shortcoming of basic SPSS implementations

The choice between linear transformation and a log-interval transformation. The latter is in effect the non-linear power transformation (see The User's Guide to Multidimensional Scaling 5.2.3.3).

Overall stress (here, the coefficient of alienation, kappa) is partitioned between each point ("Point Contribution to Stress"), so that badness of fit can be pinpointed

Solutions can also be run in any Minkowski metric (see The User's Guide to Multidimensional Scaling 5.3.3.2). The default is Euclideanmetric.

2. **MDSX DOCUMENTATION:**

MDS(X) Users Manual, Edinburgh 1981, ch. 9 (*MRSCAL_TUM.pdf*)

The User' Guide to MDS, Heinemann 1982 ,ch 5,6:
MRSCAL_TUG_Minkowski.pdf

MRSCAL_TUG523.pdf
MRSCAL_TUG614_BasicMetric.pdf
MRSCAL_TUGA52_DtoSP.pdf
TUG_A31_Measures of Fit.pdf

3. MDSX DATA:

TEST INPUT: (*TESTMRSCAL_INP.txt*)
Consists of two TASKS, analysing two classic data-sets:
(1) Red Hue Munsell Colours, Differing in Brightness & Saturation.
The data are derived from 82 Triadic judments by 38 Subjects,
See Torgerson 1963), pp280 et Seq
(2) Morse Codes for numerals 1 to 10, same/different judgment of presented pairs made by 598 airmen awaiting basic training. The data are the percentage of men who judged a pair of different codes to be "the same", and excluding the diagonal of genuinely same codes. (This is Coombs' subset of the Ropfkopf (1957) data)
See Coombs (1964, Table 22.15, p 481).
N.B. the original MRSCAL test data, mentioned in MDS(X) User Manual, was Social mobility between 13 occupational groups, defined by the Index of dissimilarity. (Macdonald 1972), which is the MINISSA test-data set.

TESTOUTPUT: (*TESTMDPREF_OUT.txt)*

4. COMMENTS:

MRSCAL is a metric program, so mu (a correlation measure between distances and fitting values) is used as a measure of goodness of fit, and kappa (a Guttman measure of badness of fit akin to Stress) are used (see The User's Guide to Multidimensional Scaling Appendix A3.1 which gives the relationships between the fit measures *TUG_A31Measures of Fit.pdf*)

5. HINTS:

Often used subsequent to a MINISSA run, and as a means of establishing law-like relations between data and scaled data. A modern (and more stable and reliable) equivalent of Classic Scaling, obviating separate estimation of the additive constant, though the intercept of the linear transformation serves this purpose.

6. REFERENCES

BASIC REFERENCE:

Roskam, E.E. (1972) M.D.S. by metric transformation of the data, Psychologie, 27,

Other references

Coombs, C.H. (1964) A Theory of Data, London: Wiley
Rothkopf, E.Z. (1957) A measure of stimulus similarity and errors in some paired-associate learning tasks, J Experimental Psychology, 53, 93-101

7. STATUS

The algorithm appears to be stable and reliable. Usage: Moderate