



Notes and Comments on PINDIS

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PINDIS (Procrustean INdividual Differences Scaling)

provides internal (and external) analysis of:

- three-way, three-mode set of configuration co-ordinates as *data* matrices
 - by means of an hierarchy of weighted and unweighted variants of both scalar-products (vector) and weighted and unweighted variants of Euclidean distance *models*
 - using a hierarchy of increasingly complex (permissible and impermissible) *transformations* of the data.
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1. PINDIS is a set of models developed by Lingoes within the G-L series, for analysing a set of configurations (NOT dis/similarity data matrices, usually derived from previous scalings or factor analyses. The simplest model (Procrustes scaling) compares the configurations to each other (or to a fixed Target configuration), by using permissible (similarity) transformations like reflection and unit weight re-scaling. The other models form a double hierarchy (A) Distance Models (akin to INDSCAL and IDIOSCAL) (B) Vector Models (where points are moved nearer or further in their direction from the origin):

P0:	Basic Model	Procrustes (Similarity Transformation)
P1:	Dimensional Weighting	(Quasi-INDSCAL)
P2:	Dim. Weight & Rotation	(Quasi-IDIOSCAL)
P3:	Vector	("Perspective")
P4:	Vector & Translation	("Idio-Perspective")
P5:	Double Weighting	

2. **MDSX DOCUMENTATION:**

MDS(X) Users Manual, Edinburgh 1981, ch. 4(*PINDIS_TUM.pdf*)

The User' Guide to MDS, Heinemann 1982 , 7.3 and A7.1

(*PINDIS_TUG73.pdf*, *PINDIS_TUGA71_Geom Transformations.pdf*)

3. MDSX DATA:

TEST INPUT: (*TESTPINDIS_INP.txt*)

Test data supplied by Lingoes: Structure of worries; 3 configurations

TESTOUTPUT: (*TESTPINDIS_OUT.txt*)

4. COMMENTS:

PINDIS is a very complex program, even though its most common use is probably for rotating a set of configurations into maximum conformity or to a fixed Hypothesis matrix. The more complex models are profligate in the use of parameters, and can lead to problems of suboptimality and estimation. *Caveat emptor!* At the same time, there are some most interesting applications, and Langeheine (1980) has provided very valuable norms based upon extensive simulation for assessment of PINDIS parameter values.

5. HINTS:

The documentation is sparse, and experience of use of the program is patchy and hard to systematize.

Note that if PINDIS is to be used Externally, the MDSX instructions:

INPUT FORMAT (*Input format*)

READ HYPOTHESIS

prefaces the input of a Target matrix co-ordinates. This then becomes the Centroid (Group) configuration at P), and will then be rotated, translated, weighted (as appropriate) in higher-level models.

6. REFERENCES

BASIC REFERENCES:

Gower, J.C. (1975): Generalized Procrustes Analysis. Psychometrika 40 , 33-51

Lingoes, J.C & I Borg (1978) A direct approach to individual differences scaling using increasingly complex transformations, Psychometrika, 43, 491-519

Other:

- Langeheine, R (1980) Approximate norms and significance tests for the LINGOES-BORG procrustes individual differences scaling [PINDIS]. Keil: Institut für die Pädagogik der Naturwissenschaften
 (1982) Statistical evaluation of measures of fit in the Lingoes-Borg Procrustean individual differences scaling. Psychometrika, 47, 427-442.

<http://www.fsw.leidenuniv.nl/~kroonenb/> (Three Mode Bibliography)

7. STATUS

It has to be said that there are computational indeterminacies in this algorithm, and the status of the program should be viewed as provisional. Usage: small

