



Notes and Comments on PRO-FIT**

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PROFIT (PROperty- FITting) provides external analysis or interpretation of a configuration by means of :

1. a set of property ratings or rankings in row-conditional rectangular format *data*
 2. by means of a scalar products (vector) *model*
 3. using either a linear (metric) or continuity *transformation* of the data.
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1. This program originates in the Bell Laboratories series (Carroll and Chang 1964, 1968) as PROFIT. It takes an externally defined configuration and then fits a set of values (e.g. physical properties or ratings) into this provided space, according to a scalar products (factor / component / vector) model. For each property, PROFIT finds a vector in the space such that the projections of the stimulus points on that vector correspond optimally with the given property values. In effect the program regresses the external properties into the space to indicate the direction in which each property increases. This regression can either be linear, or a “continuity” (non-linear) transformation. Each property has a goodness-of-fit (correlation) measure calculated, and the angle between the properties indicates the extent to which they are correlated with each other.

2. **MDSX DOCUMENTATION:**

MDS(X) Users Manual, Edinburgh 1981, ch. 14 (*PROFIT_TUM.pdf*)
The User' Guide to MDS, Heinemann 1982 ,5.2.2 and 6.2.1; Appendix 5.1
(*PROFIT_TUG522 Continuity. pdf*, *PROFIT_TUG621 ExtMapping. pdf*,
PROFIT_TUGA51Kappa. pdf)
The User's Guide to Multidimensional Scaling Ch 4 (“Interpreting Configurations”) (*INTERPRETINGCONFIGS_TUG_Ch4.pdf*)

3. **MDSX DATA:**

TEST INPUT: A set of test data given in Carroll & Chang 1968: Artificial Data,
20 Points 4 Dimensions 4 Properties
(*TESTPROFIT_INP.txt*)

TEST OUTPUT:
(TESTPROFIT_OUT.txt)

4. COMMENTS:

Where do the “external properties” come from? The “external properties” can be of various sorts:

physical counterparts of perceived/psychological variables, used to identify dimensions in factor analysis and INDSCAL, ratings or “guestimates” made by the researcher to identify regions or linear variables in the solution space of a scaling solution.

numerical variables from a previous or related study (such as the use of Osgood’s Semantic Differential factors in linguistic lexical or semantic studies Subjects’ evaluative rankings/ratings embedded in a prior, separately estimated, similarity space.

5. HINTS:

i) PROFIT is often used simply as a way of interpreting a configuration in terms of its directional (linear, dimensional) properties . Like PREFMAP (especially phases III and IV) (qv) PROFIT is also used as an external property-fitting procedure allowing the property/ies to be represented as an “ideal vector” or direction The use of PROFIT (and other MDSX programs) in interpreting configurations is contained in chapter 4 of The User’s Guide to Multidimensional Scaling (see Documentation)

6. REFERENCES

BASIC REFERENCES:

Carroll, J.D. and J-J Chang

(1964) A general index of non-linear correlation and its application to the problem of relating physical and psychological dimensions. Murray Hill, NJ: Bell Telephone Laboratories, unpublished

(1968) How to use PROFIT, a computer program for property-fitting by optimizing non-linear or linear correlation. Murray Hill, NJ: Bell Telephone Laboratories, unpublished

Other references

<http://www.analytictech.com/borgatti/profit.htm> Borgatti’s account of PROFIT, with examples.

7. STATUS

The algorithm appears to be stable and reliable, but use of the non-linear option can cause problems of under/overflow. Usage: Moderate