

Avoiding degeneracy in metric unfolding by penalizing the intercept

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Abstract

It has long been thought that degeneracy in unfolding only concerned nonmetric unfolding. Recently, Busing, Groenen and Heiser (submitted) have established that degeneracy occurs for all transformations which include estimation of an intercept and a slope. Consequently, degeneracy also plagues metric unfolding, in particular interval unfolding. For interval unfolding, a degenerate solution commonly shows a horizontal transformation line, with a positive intercept and a zero slope. The configuration of such a solution usually shows two or four points at equal distance, containing objects of just one set per point.

We propose a simple solution to the degeneracy problem for interval unfolding by penalizing for the undesirable intercept. By doing so, the intercept is "pulled down" and a simple sum-of-squares normalization forces a nonzero slope. Adjustments to the loss function and the transformation function will be shown, although the procedure is also applicable using commonly available MDS programs. The benefits of the approach are illustrated using a well-known dataset.

References

Busing, F.M.T.A., Groenen, P.J.F, and Heiser, W.J. (2001). Avoiding degeneracy in multidimensional unfolding by penalizing on the coefficient of variation. (manuscript submitted for publication).