

Dynamic transitions between multivariate methods

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Keywords: Dynamic graphics, Multivariate analysis, Power transformations, Singular-value decomposition

The family of multivariate methods based on the singular value decomposition (SVD) is wide and varied. From the ‘vanilla’ option of principal component analysis (PCA) to the ‘mixed fruit & chocolate sauce’ options of canonical correspondence analysis (CCA) and weighted log-ratio analysis (LRA), we find a spectrum of methods applicable to continuous, categorical and compositional data, depending on certain choices made with respect to

1. transformation of the input data,
2. the weighting of the cases and variables, and
3. the metric defined between cases and between variables.

In this talk I introduce parameters into this family of methods to link them together in hybrids, making use of one or more of the above three aspects. The R environment then allows viewing the smooth transition between methods dynamically: for example, between PCA and correspondence analysis (CA), between PCA and linear discriminant analysis (LDA), between CA and LRA, between CA and CCA, between PCA and multiple correspondence analysis (MCA) via multiple factor analysis (MFA), and between the MCA of crisp and fuzzy coded data. Apart from the spin-off of hybridizing these methods and thereby enriching the family of possibilities, this approach provides striking pedagogical examples for understanding the differences in practice between the methods.

References

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