

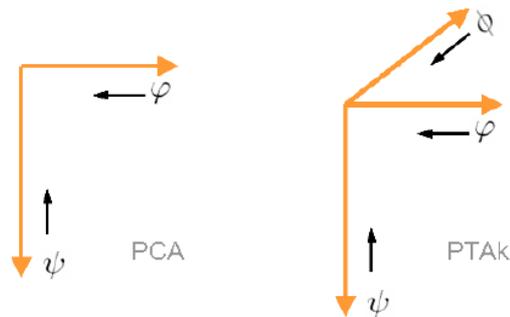


A multiway method to decompose a tensor (array) of any order, as a generalisation of SVD also supporting non-identity metrics and penalisations. 2-way SVD with these extensions is also available. The package includes also some other multiway methods: PCAn (Tucker-n) and PARAFAC/CANDECOMP with these extensions.

*See Leibovici (2010) JSS paper, for a step by step description with examples in the context of spatial data.*

*See also Leibovici et al. (2007) IEEE, Leibovici and Jackson (2011) IJIDF for other examples with spatial data;  
and examples with Multiway correspondence analysis in Leibovici and Birkin (2013) etc.*

Figure 1: Illustrative comparison between PCA and PTAK (here with  $k = 3$ ) when computing singular values by Complete Contractions given in the equations 1 and 2: the basis of the RPVSCC algorithm.



some references

[Leibovici DG](#) and Birkin MH (2013) Simple, multiple and multiway correspondence analysis applied to spatial census-based population microsimulation studies using R. **NCRM Working Paper. NCRM-n°07/13, Id-3178**

[Leibovici DG](#), and Jackson M (2011) *Multi-scale Integration for Spatio-Temporal Ecoregioning Delineation*. **International Journal of Image and Data Fusion, 2(2): 105-119**

[Leibovici DG](#) (2010) *Spatio-temporal Multiway Decomposition using Principal Tensor Analysis on k-modes: the R package PTAk.* **Journal of Statistical Software, 34(10), 1-34**

[Leibovici DG](#), Quillevere, G. and Desconnets, J-C, (2007) *A Method to Classify Ecoclimatic Arid and Semi-Arid Zones in Circum-Saharan Africa Using Monthly Dynamics of Multiple Indicators*. **IEEE Transactions on Geoscience and Remote Sensing, 45(12), 4000-4007.**