Common and cluster-specific simultaneous component analysis

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Abstract

In many fields of research, so-called 'multiblock' data are collected, i.e., data containing multivariate observations that are nested within higher-level research units (e.g., inhabitants of different countries). Each higher-level unit (e.g., country) then corresponds to a 'data block'. For such data, it may be interesting to investigate the extent to which the correlation structure of the variables differs between the data blocks. More specifically, when capturing the correlation structure by means of component analysis, one may want to explore which components are common across all data blocks and which components differ across the data blocks. This paper presents a common and cluster-specific simultaneous component method which clusters the data blocks according to their correlation structure and allows for common and cluster-specific components. Model estimation and model selection procedures are described and simulation results validate their performance. Also, the method is applied to data from cross-cultural values research to illustrate its empirical value.