Finiteness of small factor analysis models

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Abstract   We consider factor analysis models with one or two factors. Fixing the number of factors, we prove a finiteness result about the covariance matrix parameter space when the size of the covariance matrix increases. According to this result, there exists a distinguished matrix size starting at which one can determine whether a given covariance matrix belongs to the parameter space by determining whether all principal submatrices of the distinguished size belong to the corresponding parameter space. We show that the distinguished matrix size is four in the model with one factor and six with two factors.

Keywords   Algebraic statistics · Graphical model · Multivariate normal distribution · Latent variables