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Algebraic Models for Multilinear Dependence

We discuss a new statistical technique inspired by research in tensor geometry and making use of cumulants, the higher order tensor analogs of the covariance matrix. For non-Gaussian data not derived from independent factors, tensor decomposition techniques for factor analysis such as Principal Component Analysis and Independent Component Analysis are inadequate. Seeking a small, closed space of models which is computable and captures higher-order dependence leads to a proposed extension of PCA and ICA, Principal Cumulant Component Analysis (PCCA). Estimation is performed by maximization over a Grassmannian. Joint work with L.-H. Lim.