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Nested Subspaces Asymptotics

For sequences of backward nested subspaces as occur in dimension reduction for manifold or stratified space valued data, asymptotic results are derived. Under rather general conditions, asymptotic strong consistency holds. Under additional hypotheses, among them existence of a.s. local twice differentiable charts, asymptotic joint normality of the sequence of backward nested subspaces can be shown. If charts split suitably, this leads to asymptotic normality of each single subspace element. In particular it is shown that the latter result pertains to principal nested spheres (PNS) analysis recently (2010) introduced by Jung, Dryden and Marron.