$S_t \circ c(h)(a_s)_{ti} c(s) + \mathfrak{S}_e m^i n(a_r)$

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Tests of independence for functional observations

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The last two decades have seen the emergence of new technology allowing the collection and storage of time series of finely sampled records. Data of this type can be conveniently viewed as functional (curve) observations. Most statistical procedures of functional data analysis rely on the assumption of independent identically distributed functional observations, which requires careful verification in observational data derived from time series. We propose a χ^2 test for independence and identical distribution of functional observations and a test for lack of linear functional dependence. Asymptotic theory based on functional principal component expansions and Hilbert space techniques is discussed. The tests are shown to have good empirical size and power. Their application is illustrated on data sets derived from credit card sales activity and geomagnetic records.