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Two Sample Inference in Functional Linear Models

ABSTRACT

We propose a method of comparing two functional linear models in which explanatory variables are functions (curves) and responses can be either scalars or functions. In such models, the role of parameter vectors (or matrices) is played by integral operators acting on a function space. We test the null hypothesis that these operators are the same in two independent samples. The complexity of the test statistics increases as we move from scalar to functional responses and relax assumptions on the covariance structure of the regressors. They all, however, have an asymptotic chi-squared distribution with the number of degrees of freedom which depends on a specific setting. The test statistics are readily computable using the R package fda, and have good finite sample properties. The test is applied to egg-laying curves of Mediterranean flies and to data from terrestrial magnetic observatories. The Canadian Journal of Statistics © 2009 Statistical Society of Canada