

A Goodness-of-fit Test for Parametric and Semiparametric Models in Multiresponse Regression

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ABSTRACT

We propose an empirical likelihood test that is able to test the goodness-of-fit of a class of parametric and semiparametric multiresponse regression models. The class includes as special cases fully parametric models, semiparametric models, like the multi-index and the partially linear models, and models with shape constraints. Another feature of the test is that it allows both the response variable and the covariate be multivariate, which means that multiple regression curves can be tested simultaneously. The test also allows the presence of infinite dimensional nuisance functions in the model to be tested. It is shown that the empirical likelihood test statistic is asymptotically normally distributed under certain mild conditions and permits a wild bootstrap calibration. Despite that the class of models which can be considered is very large, the empirical likelihood test enjoys good power properties against departures from a hypothesized model within the class.

Key Words: Additive regression, bootstrap, empirical likelihood, goodness-of-fit, infinite dimensional parameter, kernel estimation, monotone regression, partially linear regression.