Spline Estimation of Functional Coefficient Regression Models with Correlated Errors

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Many data in applications exhibit nonlinear features such as nonlinearity between lagged variables and heteroscedasticity. They require nonlinear models to describe the data. Parametric nonlinear time series models provide powerful tools for analyzing nonlinear time series data when the models are correctly specified, thus the choice for the form of a parametric model is very critical. A natural alternative is to use nonparametric methods. One of the interesting nonparametric models to fit nonlinear time series is the well known functional coefficient regression model (FCRM). There are in literature some works related to this model, with different approaches of estimation (e.g., kernel estimation, spline estimation). A very common supposition of the model is related to the errors, where they are natural to be supposed independent. In this work we will study the estimation of FCRM by splines, with dependent errors. The comparison of the rate of convergence between the models with correlated and no correlated errors will be done. Moreover, a real application will illustrate the method by fitting a model and performing forecasts. We will compare our results with others used in literature.

Key Words: Polynomial splines, nonlinear time series, absolute prediction error.