

Estimation and testing in a partial linear regression model under long memory dependence

Germán Aneiros-Pérez¹, Wenceslao González-Manteiga² and Philippe Vieu³

¹Departamento de Matemáticas, Facultad de Informática, Universidad de La Coruña, La Coruña, Spain

²Departamento de Estadística e Investigación Operativa, Facultad de Matemáticas, Universidad de Santiago de Compostela, Santiago de Compostela, Spain

³Laboratoire de Statistique et Probabilités, UMR CNRS C55830, Université Paul Sabatier, France

Abstract

We discuss estimation and testing of hypotheses in a partial linear regression model, that is, a regression model where the regression function is the sum of a linear and a nonparametric component. We focus on the case where the covariables and the random noise do not necessarily have summable autocovariance functions, and the estimators and test statistics are based on kernel smoothing. We obtain the bias, variance and asymptotic distribution of both estimators for the parametric and nonparametric parts, as well as the asymptotic distributions of the statistics used, both under the null hypothesis and local alternatives. We thus generalize the results of Speckman and of Beran and Ghosh to the case of general structures for the autocovariance function and complete the results of González-Manteiga and Vilar-Fernández to the case of a partial linear regression model. Simulations and a real data example provide promising results for our tests.