Ann Inst Stat Math (2011) 63:1047–1075
DOI 10.1007/s10463-010-0275-8

Local linear regression for functional data

A. Berlinet · A. Elamine · A. Mas

Received: 29 February 2008 / Revised: 28 July 2009 / Published online: 10 March 2010

Abstract We study a non-linear regression model with functional data as inputs and scalar response. We propose a pointwise estimate of the regression function that maps a Hilbert space onto the real line by a local linear method and derive its asymptotic mean square error. Computations involve a linear inverse problem as well as a representation of the small ball probability of the data and are based on recent advances in this area.

Keywords Functional data · Regression model · Kernel · Mean square error · Small ball probability · Inverse problem