Fitting Functions to Data with Error Bounds: Fuzzy regression with ERRGO

T. Solymosi, J. Dombi
Research Group on the theory of Automata, Szeged

1992

Abstract

Curve fitting problems on the plane, where errors can occur in both variables, tolerance regions can be specified around the data points and only such functions are interest whose curves cross each other of these regions, can be formulated as fuzzy regressions. The usual parameter estimation methods do not guarantee fits within prescribed pointwise error bounds. A univariate fuzzy regression problem is formulated where functions with crisp parameter values are fitted to fuzzy data. The minimum possibility of that the data and the related fitted fuzzy numbers are equal is used to measure the goodness of fit, and is to be maximized over the parameter region. Conditions are discussed under which there is a best fit and an algorithm is proposed to approximate it in the linear case. Due to the reduction to a sequence of basic problems the same method can be used for linear and linearizable functions.

Keywords: fuzzy regression, curve fitting, ERRGO