Abstract

This paper provides a nonparametric analysis for several classes of models, with cases such as classical measurement error, regression with errors in variables, and other models that may be represented in a form involving convolution equations. The focus here is on conditions for existence of solutions, nonparametric identification and well-posedness in the space S^* of generalized functions (tempered distributions). This space provides advantages over working in function spaces by relaxing assumptions and extending the results to include a wider variety of models, for example by not requiring existence of density. Classes of (generalized) functions for which solutions exist are defined; identification conditions, partial identification and its implications are discussed. Conditions for well-posedness are given and the related issues of plug-in estimation and regularization are examined.

1 Introduction

Many statistical and econometric models involve independence (or conditional independence) conditions that can be expressed via convolution. Examples are independent errors, classical measurement error and Berkson error, regressions involving data measured with these types of errors, common factor models and models that conditionally on some variables can be represented in similar forms, such as a nonparametric panel data model with errors conditionally on observables independent of the idiosyncratic component.