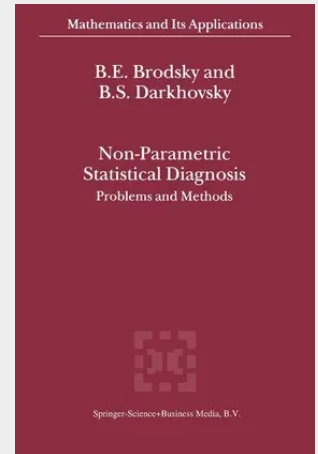


Non-Parametric Statistical Diagnosis

Problems and Methods

This book has a distinct philosophy and it is appropriate to make it explicit at the outset. In our view almost all classic statistical inference is based upon the assumption (explicit or implicit) that there exists a fixed probabilistic mechanism of data generation. Unlike classic statistical inference, this book is devoted to the statistical analysis of data about complex objects with more than one probabilistic mechanism of data generation. We think that the existence of more than one data generation process (DGP) is the most important characteristic of complex systems. When the hypothesis of statistical homogeneity holds true, i.e., there exists only one mechanism of data generation, all statistical inference is based upon the fundamental laws of large numbers. However, the situation is completely different when the probabilistic law of data generation can change (in time or in the phase space). In this case all data obtained must be 'sorted' in subsamples generated by different probabilistic mechanisms. Only after such classification we can make correct inferences about all DGPs. There exists yet another type of problem for complex systems. Here it is important to detect possible (but unpredictable) changes of DGPs online with data collection. Since the complex system can change the probabilistic mechanism of data generation, the correct statistical analysis of such data must begin with decisions about possible changes in DGPs.

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