Nonparametric goodness-of-fit testing under Gaussian models.


According to the authors, the book under review is aimed at mathematical statisticians interested in the theory of nonparametric statistical inference. The main thrust of the monograph is goodness-of-fit testing for signal detection, especially in the infinite dimensional parameters setting. It covers both the Gaussian processes case and the nonparametric case. The tests are based on the “minimax approach”. Most of the content seems to be based on the work of one of the authors. The results are claimed to be “best or near-to-best rates of testing”. The monograph starts with “infinite dimensional or with increased-dimensional” Gaussian models.

After introducing the problem and giving a general discussion of it in Chapters 1 and 2, the initial results on “minimax” properties of various classes of tests with upper bounds for the “minimax quality of testing” are presented in Chapter 3. Asymptotics are developed for simple cases in Chapter 4, and for the general Gaussian case in Chapter 5. “Gaussian asymptotics” for power and Besov norms are presented in Chapter 6. They include “extreme problems in a two-sequence” space. “Adaptive” hypothesis testing is considered in Chapter 7. In Chapter 8, the authors discuss some new phenomena in minimax nonparametric hypothesis testing problems.

The book under review is very difficult to read, mainly because it is not written in a reader friendly style. The construction of the sentences is difficult to understand. Changes in the notation in the middle of a chapter also contribute to the difficulty. For example, $\bar{D}_{n}(\rho)$ in Section 1.3 is replaced by $\bar{D}_{n}(\rho)$ in Section 1.4.2.

Another difficulty in reading the book is the absence of definitions or explanations of terms used. For example, the term “nondistinguishability” appears in the title of Section 1.4.2, but it is not clear what it means. It does not appear anywhere else in that section. The term “minimax distinguishability” is used in Section 2.6, also without a clear definition.

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