Institut für Statistik

Seminarvortrag

Donnerstag, 20. November 2025, 14:00 Uhr

SR für Statistik (NT03098), Kopernikusgasse 24, 3.OG.

Sharp oracle inequalities and universality of the AIC and FPE

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Abstact:

In two landmark papers, Akaike introduced the AIC and FPE, demonstrating their significant usefulness for prediction. In subsequent seminal works, Shibata developed a notion of asymptotic efficiency and showed that both AIC and FPE are optimal, setting the stage for decades-long developments and research in this area and beyond. Conceptually, the theory of efficiency is universal in the sense that it (formally) only relies on second-order properties of the underlying process, but, so far, almost all (efficiency) results require the much stronger assumption of a linear process with independent innovations. In this work, we establish sharp oracle inequalities subject only to a very general notion of weak dependence, establishing a universal property of the AIC and FPE. A direct corollary of our inequalities is asymptotic efficiency of these criteria. Our framework contains many prominent dynamical systems such as random walks on the regular group, functionals of iterated random systems, functionals of (augmented) Garch models of any order, functionals of (Banach space valued) linear processes, possibly infinite memory Markov chains, dynamical systems arising from SDEs, and many more. Furthermore, we address the question whether it makes sense to compare the AIC score of two models.

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