מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Machine Learning and Statistics Seminar

Room 1 ,Ziskind Building
on Wednesday, Dec 23, 2015
at 11:15

Tirza Routtenberg
Ben Gurion University

Estimation after parameter selection: Estimation methods, performance analysis, and adaptive sampling

Abstract:

In many practical parameter estimation problems, such as medical experiments and cognitive radio communications, parameter selection is performed prior to estimation. The selection process has a major impact on subsequent estimation by introducing a selection bias and creating coupling between decoupled parameters. As a result, classical estimation theory may be inappropriate and inaccurate and a new methodology is needed. In this study, the problem of estimating a preselected unknown deterministic parameter, chosen from a parameter set based on a predetermined data-based selection rule, \Psi, is considered. In this talk, I present a general non-Bayesian estimation theory for estimation after parameter selection, includes estimation methods, performance analysis, and adaptive sampling strategies. First, I use the post-selection mean-square-error (PSMSE) criterion as a performance measure instead of the commonly used mean-square-error (MSE). The corresponding Cramér-Rao-type bound on the PSMSE of any \Psi-unbiased estimator is derived, where the \Psi -unbiasedness is in the Lehmann-unbiasedness sense. The post-selection maximum-likelihood (PSML) estimator is presented and its \Psi–efficiency properties are demonstrated. Practical implementations of the PSML estimator are proposed as well. Finally, I discuss the concept of adaptive sampling in a two-sampling stages scheme of selection and estimation.

Email: hanni.naor@weizmann.ac.il * Phone: (08)9343349 * Fax: (08)9344308