STANFORD UNIVERSITY

DEPARTMENT OF STATISTICS

DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, October 3, 2000
Sequoia Hall Rm. 200
(Cookies at 3:45 in 1st Floor Lounge)

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Extended Exponential Criterion: A New Selection Procedure For Scatterplot Smoothers

Nonparametric regression, such as smoothing spline, is widely used in many scientific disciplines as a valuable data-analyzing method. The use of a smoother requires the choice of a smoothing parameter which, by balancing fidelity and roughness, controls how much the smoothing is done. Two popular selection criteria to choose the smoothing parameter are C_p and generalized maximum likelihood (GML). Each, however, has its own problem. For C_p the problem is its high variability, while for GML, the problem is its potentially big bias. In this talk we propose a new selection procedure: the extended exponential (EE) criterion, which combines the strength of C_p and GML, yet avoids their weakness in that the EE criterion has (a) small variability, (b) small bias. In addition to these, it also has (c) small tendency toward under and oversmoothing. All three criteria turn out to have simple geometric interpretation, which plays a pivotal role in our finite-sample, non-asymptotic theoretical analysis. The EE criterion is also shown to be more robust against non-normality. In the end, some large sample results are presented.