Combining parametric and empirical likelihoods

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This talk introduces a hybrid likelihood method based on a compromise between parametric and nonparametric likelihoods.Suppose we are in the setting of a parametric model for the distribution of an observation X and the parameter is θ. Also suppose we are given an estimating function $m(.,\mu)$ depending on another parameter $\mu = \mu(\theta)$ that is identified by $\mathbb{E}m(X,\mu) = 0$. To borrow strength from the parametric model while obtaining a degree of robustness from the empirical likelihood method, we study ways of formulating inference about θ in terms of the *hybrid likelihood function*

$$H_n(\theta) = L_n(\theta)^{1-\alpha} R_n(\mu(\theta))^{\alpha}$$

where $0 \leq \alpha \leq 1$ represents the extent of the compromise, L_n is the ordinary parametric likelihood for θ, and R_n is the empirical likelihood function. We describe the asymptotic behavior of the maximum hybrid likelihood estimator under various conditions, and develop a suitable calibration for confidence regions of the form $\{\theta: H_n(\theta) > c\}$. The talk is based on joint work with Nils Hjort and Ingrid Van Keilegom.