



Department of Decision Sciences

Statistics Seminar

## Median bias reduction of maximum likelihood estimates

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Thursday, 1<sup>st</sup> December 2016

12:30pm Room 3-E4-SR03 Via Röntgen 1 Milano

### Abstract

For regular parametric problems, we show how median centering of the maximum likelihood estimate can be achieved by a simple modification of the score equation. For a scalar parameter of interest, the estimator is third-order median unbiased and equivariant under interest respecting reparameterizations. With a vector parameter of interest, componentwise equivariance and third-order median centering are obtained. The new method does not depend on the existence of the maximum likelihood estimate and is effective in preventing infinite estimates, like Firth's (1993, *Biometrika*) implicit method for bias reduction. Simulation results for continuous and discrete models, including binary regression, confirm that the method succeeds in solving the infinite estimate problem and in achieving componentwise median centering, while keeping comparable dispersion and the same approximate distribution as its main competitors. The properties of the method are maintained also in extreme settings, characterized by large dimensional parameters.

Joint with E. C. Kenne Pagui and A. Salvan