# A Penalized Empirical Likelihood Method in High Dimensions[*]

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## ABSTRACT

We formulate a penalized empirical likelihood (PEL) method for inference on the population mean when the dimension of the observations become unbounded with the sample size. We derive the asymptotic distribution of the PEL ratio statistic. We show that the limit distribution of the proposed PEL ratio statistic can vary widely depending on the correlation structure of the components of the observations that we classify as (i) non-Ergodic, (ii) long range dependent, and (iii) short range dependent. The limit laws differ from the usual chi-squared limit of the empirical likelihood ratio statistic in the finite dimensional case. We propose a subsampling approximation for calibrating the PEL ratio test statistic and establish its validity. Finite sample properties of the method are investigated through a simulation study.

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[*]Joint work with Deep Mukhopadhyay .