VARIABLE SELECTION FOR JOINT MEAN AND DISPERSION MODELS OF THE LOGNORMAL DISTRIBUTION

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Abstract

The lognormal distribution is widely used in applications. Variable selection is an important issue in all regression analysis and in this paper we investigate simultaneous variable selection in the joint mean and dispersion models of the lognormal distribution. We propose a unified penalized likelihood method which can simultaneously select significant variables in the mean and dispersion models. Furthermore, the proposed variable selection method can simultaneously perform parameter estimation and variable selection in the mean and dispersion models. With appropriate selection of the tuning parameters, we establish the consistency and the oracle property of the regularized estimators. Some simulation studies and a real example are used to illustrate the proposed method.

Keywords: Joint mean and dispersion models of the lognormal distribution, LASSO, Penalized maximum likelihood, SCAD, Variable selection.