Overdispersed Nonlinear Regression Models

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In this talk we propose nonlinear regression models in the biparametric family of distributions. In this class of models we propose two new classes of overdispersed nonlinear regression models: the first, defined from the overdispersion family of distributions proposed by Dey, Gelfand and Peng, and the second from a class of compound distributions. For these models, we develop a Bayesian method in which samples of the posterior distributions are obtained by applying an iterated Metropolis-Hastings algorithm obtained by assuming two groups of parameters, defined by the mean and dispersion regression structures. In the first subclass of models, to improve the performance of the iterated Metropolis-Hastings algorithm, we develop worked variables from the Fisher scoring algorithm, through maximum likelihood estimation of the parameters, to build the kernel transition function. A Bayesian method to fit compound models also is proposed. Finally, we present a simulation study and an application to the neonatal mortality to illustrate the use of the proposed models and the performance of the Bayesian method to fit the proposed models.

Keywords: Overdispersed nonlinear regression, Bayesian methods.