

MAXIMUM LIKELIHOOD ESTIMATION FOR THE POISSON-BINOMIAL DISTRIBUTION VIA THE EM ALGORITHM WITH ENVIRONMENTAL APPLICATIONS

Dimitris Karlis and Evdokia Xekalaki

The Poisson-Binomial distribution arises as the convolution of a Poisson with a Binomial distribution. The complicated form of its probability function has confined the applicability of the distribution in real practical problems. In this note we fully describe ML estimation for the parameters of the Poisson-Binomial distribution. The EM algorithm is applied, using the latent structure of the derivation of the distribution as a convolution of two non-observable random variables. Extensions of the algorithm to cover cases of finite mixtures of this distribution are given. These algorithms can be very helpful in estimating the parameters of discrete valued time series and in particular for the INAR(1) and the SINAR(1) processes. The developed algorithm is applied to simulated data. Environmental applications are also considered.

DIMITRIS KARLIS
Department of Statistics, AUEB
Athens, Greece