DISCRETE TIME SERIES MODELS WITH APPLICATION TO EPILEPTIC SEIZURES

Nikkie Yiokari and Evdokia Xekalaki

Daily seizure counts are a prime tool in investigating epileptic disease and examining the effectiveness of certain drugs. Does an epileptic fit make the patient prone to have another fit in the near future? Do unobservable factors exist that may contribute to an epileptic fit? These are a few of many questions that arise in epileptic disease investigations.

In this paper questions of this nature are investigated on the basis of data on epileptic fit occurrences. These are viewed as time series of counts, i.e. as non-negative, integer-valued stochastic processes in discrete time. We present models that are useful for the modeling of discrete-time dependent counting processes and pay special attention to the integer-valued autoregressive (INAR) and the switching integer-valued autoregressive (SINAR) models. The SINAR model is fitted to a series of daily counts of epileptic seizures of a patient. The EM-algorithm is used in order to estimate the parameters of this model.

NIKKIE YIOKARI
Department of Statistics, AUEB
Athens, Greece