

COVARIATES AND TIME IN THE AUTOLOGISTIC MODEL

by

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ABSTRACT

An issue that arises in a number of environmental monitoring situations is that of detecting and modeling changes in the structure of the underlying scientific process that govern the observable phenomena of interest. The problem structure considered in this article is one in which a fixed spatial domain is observed over a short to moderate sequence of points in time. Ideally, a statistical model used in this type of situation contains parameter values, for which we can assess change over time, that correspond to components of the underlying scientific process in an interpretable manner. A traditional approach is to consider the overall level of a process, possibly adjusted by the influence of covariates, to be appropriately modeled as what is called the large-scale model component. When the response variable is binary, a typical approach is to use the autologistic model. We demonstrate that the traditional parametrization given to autologistic models does not result in concordance of large-scale model structure and marginal data structure and we propose an alternative parametrization that overcomes this difficulty. Data on the spread of an invasive plant species is used as an illustration.