TESTING ASSOCIATION BETWEEN SPATIAL PROCESSES

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ABSTRACT

This paper addresses the study of association between two spatial processes. In particular, we consider the properties of modified tests of the empirical correlation coefficient between the processes. We show that by a simple adjustment, correct level of significance can be reached and that the power under a simple linear alternative is compatible with that of a standard test in an equivalent situation. These tests can be applied both to regularly and irregularly spaced points and can be considered as a first step in an analysis of association when detailed spatial modelling is not suitable.

Application of these tests to data gives pivotal confidence interval for the regression coefficient. Furthermore, if one is prepared to model the observed covariance structure, Monte Carlo tests of association can be performed. In the examples investigated, which concern the relationship between lung cancer, smoking, and industrial factors,the results from the two types of testing procedures were close.