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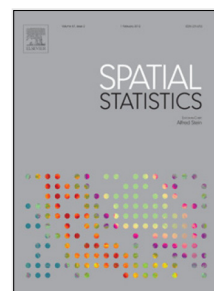
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A nonparametric test for the comparison of first-order structures of spatial point processes

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Abstract

Comparing the spatial distribution of two spatial point patterns is an important issue in many scientific areas such as ecology, epidemiology or environmental risk assessment. However, up to date, the analysis of multitype point processes has been mainly focused on searching for interactions between events of different patterns, i.e. on the second-order structure, while the first-order structure has received less attention. This work proposes testing the similarity between two spatial point patterns through the comparison of their densities of event locations. For this purpose, we consider the usual squared discrepancy measure to propose a nonparametric statistical test. The asymptotic normal distribution of the associated statistic provides a calibration procedure. The simulation study conducted to analyze the performance of the test shows that this calibration can be too conservative and supports the use of a proposed bootstrap calibration. The performance of the test is also illustrated throughout its application to the analysis of the spatial patterns of wildfires registered in Galicia (NW Spain) during 2006.

Keywords: bootstrap calibration, first-order intensity, inhomogeneous Poisson point process, kernel smoothing, wildfires

1. Introduction

A common question in the analysis of multitype spatial point processes is whether two types of events have the same spatial structure. This ques-

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