QÜESTIIÓ, vol. 26, 1-2, p. 29-59, 2002

Statistical procedures for spatial point pattern recognition

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Spatial structures in the form of point patterns arise in many different contexts, and in most of them the key goal concerns the detection and recognition of the underlying spatial pattern. Particularly interesting is the case of pattern analysis with replicated data in two or more experimental groups. This paper compares design-based and model-based approaches to the analysis of this kind of spatial data. Basic questions about pattern detection concern estimating the properties of the underlying spatial point process within each experimental group, and comparing the properties between groups. The paper discusses how either approach can be implemented in the specific context of a single-factor replicated experiment and uses simulations to show how the model-based approach can be more efficient when the underlying model assumptions hold, but potentially misleading otherwise.

Keywords: Expected significance levels, Replicated patterns, Spatial point structures

AMS Classification (MSC 2000): 62M05, 60G55

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