Detection and estimation of spatial patterns in terrestrial plant communities

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In a large variety of contexts, one can find that a study object can be seen as a set of irregularly distributed points in a two or three dimensional bounded region. And the focus is not only in the set of points whose number or location is of main interest, for it determines actions to be done with a specific purpose, but also in the different kinds of points that might appear in that set.

Sciences such as biology, epidemiology, forestry, geology, meteorology, bacteriology, etc. have in these set of points data the basis of their research. Statistics has provided a number of tools in order to analyze any given set of points. And the field of spatial point processes provide a large variety of complex patterns to model particular plant behaviours.

Besides the description of spatial data, statistics provide models or processes which can generate point data following some stochastic law. These models are often the result of the consideration of a real situation such as, in the biological context, the location of animal or plants depending on the existence of predators or food. Once we have a family of models, an important task is to determine when a given mapped data is the result of one of such models, then nonparametric or parametric inference is needed. Some other models are built upon the preceding ones, generalizing them and enlarging the family of models, as long as the existing ones prove to be unrealistic for many applications.

The goal of this paper is to present a unified and summarized theory of spatial point processes, with a particular focus on modelling terrestrial

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plant communities.

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