

Modelling complex spatial point patterns

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Most processes in the natural world take place in a spatial context and are often inherently local, particularly in plant ecology. As a result, spatially explicit data sets are frequently being collected in ecology. Previously this has been perceived as a difficulty since traditional statistical approaches are unsuitable in the presence of spatial autocorrelation.

However, recent years have seen an increasing interest in explicitly modelling this spatial dependence. Spatial point processes model the locations of objects such as individual plants, animals, nests in space. They take local dependence structures, the environment around and properties of the objects into account. A suitable model hence characterises the behaviour of every individual object based on a small number of interpretable parameters. A growing number of methods and models have been developed within the statistical literature.

In general, fitting these models is not straight forward and often computationally involved. In addition, many approaches have been derived from a rather mathematical perspective and are thus not necessarily appropriate in an ecological context. This talk will provide a general introduction to point process methodology and discusses how it may be suitably applied various context, but with a focus on ecology. It considers several applications, including complex and multivariate point pattern data sets, inhomogeneous data and marked point processes.