

Identification and estimation of superposed Neyman–Scott spatial cluster processes

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Abstract This paper proposes an estimation method for superposed spatial point patterns of Neyman–Scott cluster processes of different distance scales and cluster sizes. Unlike the ordinary single Neyman–Scott model, the superposed process of Neyman–Scott models is not identified solely by the second-order moment property of the process. To solve the identification problem, we use the nearest neighbor distance property in addition to the second-order moment property. In the present procedure, we combine an inhomogeneous Poisson likelihood based on the Palm intensity with another likelihood function based on the nearest neighbor property. The derivative of the nearest neighbor distance function is regarded as the intensity function of the rotation invariant inhomogeneous Poisson point process. The present estimation procedure is applied to two sets of ecological location data.

Keywords Contact distances · Likelihood functions · Multi-type Neyman–Scott processes · Nearest neighbor distance function · Palm intensity