



Poles of pair correlation functions: When they are real?

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Abstract

The most common standard estimator of the pair correlation function (PCF) of a point process has a pole at zero, which is in most cases a statistical artifact. However, sometimes it makes sense to assume that a pole really exists. We propose two independent approaches for the proof of existence of a PCF's pole and for the determination of its order. In the first, we use a summary characteristic F that transforms the PCF's pole order to the location of F 's pole, while the other one uses a natural estimation method based on Ripley's K -function. These methods are applied to simulated samples of two classical point process models and two cluster point process models with special geometries. Finally, we use the approach in the statistical analysis of a classical point pattern of pine trees and a highly clustered pattern of nonmetallic inclusions in steel.

Keywords Pair correlation function · High degree of clustering · Pole

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