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Point process diagnostics based on weighted second-order statistics and their asymptotic properties

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Abstract A new approach for point process diagnostics is presented. The method is based on extending second-order statistics for point processes by weighting each point by the inverse of the conditional intensity function at the point's location. The result is generalized versions of the spectral density, R/S statistic, correlation integral and K-function, which can be used to test the fit of a complex point process model with an arbitrary conditional intensity function, rather than a stationary Poisson model. Asymptotic properties of these generalized second-order statistics are derived, using an approach based on martingale theory.

Keywords Residual analysis · Point process · Second-order analysis · Conditional intensity function