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Projection approach to distribution-free testing for point processes. Regular models. (English) Zbl 1458.62189

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Summary: We create the notion of equivalence between different martingale models for point processes. This allows to map one model into another model in the same equivalence class. Therefore the distribution of test statistics for goodness of fit testing needs to be calculated in only once, for "standard" model, in each equivalence class. The equivalence classes are surprisingly broad, and thus the economy on computational work is considerable. Namely, any such class includes a non-time homogeneous Poisson model. Therefore it is sufficient to know the distribution of test statistics only for Poisson models.

The situation, therefore, becomes comparable to testing simple hypothesis about a continuous distribution function for a sample of i.i.d. random variables with continuous distribution F, when it is sufficient to consider F, uniform on $[0, 1]$. However, for point processes we consider here parametric cases, and the nature of equivalence is entirely different.

MSC:

62M09 Non-Markovian processes: estimation
60G55 Point processes (e.g., Poisson, Cox, Hawkes processes)
60G44 Martingales with continuous parameter
62G10 Nonparametric hypothesis testing

Keywords:

martingale models for point processes; models with estimated parameters; asymptotic methods; unitary operators

Full Text: Link

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