Residual analysis in point process and state space modelling

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Abstract

Residual analysis provides an important and powerful tool for model diagnostics and improvement. It allows the evaluation of model fit without the need to formulate new, computationally expensive alternatives, while highlighting both the strengths and limitations of existing models. Building on recent developments in innovation-based residuals for spatial and spatiotemporal point processes, as well as extensions to state-space models, this talk outlines the general principles of innovation-based residual analysis and its role in advancing statistical modeling. Through selected applications, I illustrate how appropriately constructed residual statistics can guide model refinement and lead to more robust statistical inference across different classes of models.