Contribution ID: 30

Bivariate change detection in absolute movement direction and speed on multiple scales

Thursday 26 September 2024 16:50 (20 minutes)

Biological movement patterns are sometimes quasi linear with abrupt changes in direction and speed, as in movements of plastids in root cells of plants. We discuss random walk (RW) models suggesting that modelling absolute movement direction can be advantageous as compared to relative direction as assumed in the widely used correlated RWs. A new stochastic model called linear walk is proposed that describes movement along linear structures with piecewise constant movement direction and speed. We provide maximum likelihood estimators and propose a moving kernel estimator in order to estimate change points on multiple time scales. Finally, we also propose a graphical technique to distinguish between change points in movement direction and speed.

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Session Classification: Multiscale Models in Cell Biology III (Chair: Franziska Matthäus)