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*Detecting fractal connectivity in high-dimensional time series*

The long-run variance matrix and its inverse, the so-called precision matrix, give respectively information about correlations and partial correlations between dependent component series of multivariate time series around zero frequency. This talk will present non-asymptotic theory for estimation of the long-run variance and precision matrices for high-dimensional time series under general assumptions on the dependence structure including long-range dependence. The presented results for thresholding and penalizing versions of the classical local Whittle estimator ensure consistent estimation in a possibly high-dimensional regime. The highlight of this talk is a concentration inequality of the local Whittle estimator for the long-run variance matrix around the true model parameters. In particular, it handles simultaneously the estimation of the memory parameters which enter the underlying model. Finally, we study the temporal and spatial dependence of multiple realized volatilities of global stock indices.