Spatio-temporal CARMA models

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Abstract

Brockwell and Matsuda [1] extended continuous ARMA (CARMA) models for time series to those for spatial data. In this talk, we aim an nonstationary extension of CARMA random fields by allowing the spectral density functions to be dependent spatially in a similar way with that of Dahlhaus [2]. We propose an efficient estimation procedure based on Whittle likelihoods and derive consistency and asymptotic normality of the estimators, Finally we apply the non-stationary CARMA random fields to US precipitation data, monthly observations of precipitation in around 6000 observatory points scattered all over US continent to demonstrate how it can detect nonstationary variations of US precipitations.

References

[1] Brockwell, P.J. and Matsuda, Y. (2017) Continuous auto-regressive moving average random fields on R^n. *J. Roy. Stat. Soc., Ser. B.***79**, pp. 833–857.

[2] Dahlhaus, R. (1997) Fitting time series models to nonstationary process. *Ann. Stat.***25**, pp. 1-37.

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