



BOSTON UNIVERSITY STATISTICS  
AND PROBABILITY SEMINAR SERIES

# Approximations of Traces of Products of Truncated Toeplitz Operators and Applications

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Mathematics and Computer Science (MCS) Building, Room 148

111 Cummington Street, Boston

Tea and Cookies at 3:30pm in MCS 153

**Abstract:** Truncated Toeplitz operators arise commonly in the statistical analysis of continuous-time stationary processes: asymptotic distributions and large deviations of Toeplitz type quadratic functionals, estimation of the spectral parameters and functionals, hypotheses testing about the spectrum, etc.

In this talk we discuss the problem of approximation of the traces of products of truncated Toeplitz operators generated by integrable real symmetric functions defined on the real line, and bounding the corresponding errors.

These approximations and the corresponding error bounds are of particular importance in the cases where the underlying model is a continuous-time stationary process with possibly unbounded or vanishing spectral density, that is, the model displays long-memory or is an anti-persistent process.

In particular, we obtain an explicit second-order asymptotic expansion for the trace of product of two truncated Toeplitz operators generated by the spectral densities of continuous-time stationary fractional Riesz-Bessel motions. We show that the order of magnitude of the second term in this expansion depends on the long-memory parameters of the underlying processes, and the singularity in the first-order approximation is removed by the second-order term, which provides a substantially improved approximation to the original functional.

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