Graz University of Technology

Institut für Statistik

Vortrag

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SR 2 der Geometrie (NT04064), Kopernikusgasse 24, 4. OG.

Hyperuniformity and Non-Hyperuniformity of Zeros of Twisted Stationary Gaussian Random Functions

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Abstract:

We present our recent results on the (non-)hyperuniformity of the zero set of a class of twisted stationary Gaussian random functions on the complex plane. We show that if zeros are weighted with their positive or negative winding number (charged zero set), the charged zero distribution is always hyperuniform. The uncharged zero set is hyperuniform for the special case of a (scaled) Gaussian entire function (GEF) but also coincides with the charged zero distribution as the winding number of all zeros is one. While we show that the uncharged zero set is not hyperuniform in general by a counterexample, it is open whether the GEF case is the only setting with hyperuniform zeros. Examples of the class of twisted stationary Gaussian random functions appear naturally as the short-time Fourier transform of signals in white noise. We will show the results of simulations in this setting and see that the (non-)hyperuniform-like behavior, i.e., a (non-)linear growth of the empirical variance with respect to the radius, is already observed in finite domains.

M. Neumann