

Zeros of Gaussian Weyl-Heisenberg functions

Antti Haimi

We study zero sets of Gaussian random functions on the complex plane enjoying twisted stationarity, that is, stochastic invariance under the action of the Weyl-Heisenberg group. This family of models includes translation invariant the Gaussian entire function (GEFs), and also many other non-analytic examples originating from signal analysis and quantum mechanics. In general, winding numbers around zeros can be either positive or negative, while for GEF they are always positive due to analyticity. We investigate zero statistics both when zeros are weighted with their winding numbers (charged zero set) and when they are not (uncharged zero set). Firstly, we show that the charged zero sets are hyperuniform, which means informally that charge fluctuations are suppressed at large scales. Secondly, we show that in some central model cases hyperuniformity does not hold for uncharged zero sets.

This is joint work with Naomi Feldheim, Günther Koliander and José Luis Romero.