

Peak height distributions of Gaussian random fields and their statistical applications

Monday, 4 March 2024 11:00 (1 hour)

Motivated by computing p-values for multiple testing of local maxima in signal and change point detections, we study the height distribution of local maxima of smooth isotropic Gaussian random fields parameterized on Euclidean space or spheres. The obtained formulae hold in general in the sense that there are no restrictions on the covariance function of the field except for smoothness and isotropy. The results are based on a characterization of the distribution of the Hessian of the Gaussian field by means of the family of Gaussian orthogonally invariant (GOI) matrices, of which the Gaussian orthogonal ensemble (GOE) is a special case. I will also present related statistical applications such as peak/signal detection in cosmology and change point detection.

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Session Classification: Chair: Satoshi Kuriki