

# Séminaire de Probabilités et Statistique

Mardi 23 Octobre à 14h00

Laboratoire Dieudonné  
Salle de conférence - LJAD

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*Lipschitz-Killing curvatures of excursion sets for two  
dimensional random fields*

Joint work with Hermine Biermé, Céline Duval et Anne Estrade (2018)

In the present work we study three geometrical characteristics for the excursion sets of a two dimensional stationary isotropic random field. First, we show that these characteristics can be estimated without bias if the considered field satisfies a kinematic formula, this is for instance the case of fields given by a function of smooth Gaussian fields or of some shot noise fields. By using the proposed estimators of these geometric characteristics, we describe some inference procedures for the estimation of the parameters of the field. An extensive simulation study illustrates the performances of each estimator. Then, we use the Euler characteristic estimator to build a test to determine whether a given field is Gaussian or not, when compared to various alternatives. The test is based on a sparse information, i.e., the excursion sets for two different levels of the field to be tested. Finally, the proposed test is adapted to an applied case, synthesized 2D digital mammograms.