STATISTICS COLLOQUIUM

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“Bayesian Nonparametric Models, Levy Random Fields, and Stochastic Expansions”

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ABSTRACT

Levy processes, although less well known than Gaussian processes or Dirichlet processes in statistics, are ideally suited for constructing nonparametric prior distributions on unknown functions using expansions with over-complete, and in particular, continuous dictionaries. In this talk I provide an overview of constructing nonparametric priors distributions on functions using Levy random fields and how these relate to the more familiar compound Poisson process. The resulting functions are able to adapt to unknown smoothness and sparsity similar to wavelet models through appropriate choice of prior distributions and generating functions; stochastic expansions using continuous wavelet dictionaries are a special case. I will discuss computational issues and challenges for implementation, and conclude with applications and comparison with other methods.
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