Interdisciplinary Stochastic Processes Colloquium

Organizer: David Aldous

Tuesday, 4:10–5:00pm, 60 Evans

Feb 19 **Anatoly Vershik**, Steklov Institute

The infinite dimensional Lebesgue measure, Levy processes with sigma-finite distribution and Poisson-Dirichlet measures

Let X be the unit interval with Lebesgue measure m. We define a sigma-finite measure $\mathcal{L}$ on the space of all discrete finite signed measures $\{\sum_k c_k \delta_{x_k}\}$ with $\sum |c_k| < \infty$ (Skorokhod space) which is invariant under the multiplicative abelian group of the functions a with property: $\int_X \ln |a(x)| dm(x) = 0$.

This measure can be called "infinite dimensional Lebesgue measure". It is possible to define the one-parametric family of such invariant measures of this type-$\mathcal{L}_\theta$ and in a sense these measures can be defined by the "characteristic functional" $\Psi_\theta(f)$:

$$\Psi_\theta(f) = \exp\{-\theta \int_X \ln ||f(x)|| dx\}, \quad \theta > 0.$$

The properties of this remarkable measure and its close connections with Levy processes (gamma processes), Poisson-Dirichlet measures $PD(\theta)$ and their generalizations will be discussed.