
ATHENS *Pr*OBABILITY COLLOQUIUM

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“Finite and Infinite Exchangeability”

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Abstract: In this talk we will review the topic of exchangeability in probability theory, starting from classical results (seen from a very nice point of view), continuing with an application to compositions of stochastic processes and ending up with new results on finite exchangeability. Exchangeability is ubiquitous in probability theory, with applications in statistical mechanics, in stochastic networks, in random graphs and Bayesian inference inter alia. The classical result in this area is de Finetti's theorem that completely characterizes exchangeable probability measures on infinite products of a "nice" space (e.g., a Polish space). But what happens to exchangeable measures on finite products? It turns out that an analogous result holds, but the mixing measure may not be positive. We also ask the question of whether an exchangeable measure in n dimensions can be extended to $n+1$ or higher dimensions. (This is not always the case, and this is a problem that appears, e.g., in extensions of statistical physics models to higher dimensions). We give a necessary and sufficient condition for this under some topological assumptions on the space.

We will strive to present the topics in a comprehensive manner without requiring prior knowledge on the topic.

Parts of this work are with Nicholas Curien (Univ. Paris Sud, France), Svante Janson (Uppsala Univ., Sweden) and Linglong Yuan (Xi'an Jiao Tong Liverpool Univ., China).

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