



Minisymposium 24 - Probability and Geometry

Exponential ergodicity, spectral gap, and their applications

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In this talk, first we give some reason for ergodic theory from our knowledge. Secondly, we present a characterization of spectral gap for positive operators and positive C_0 -semigroups in L^p -space with $1 < p < +\infty$, and we describe an equivalent relation between spectral gap and exponential ergodicity of Markov chains or Markov processes. As application, we give the existence of spectral gap to Donsker's invariance principle and Strassen's strong invariance principle for Markov chains or Markov processes, as well as some results on the existence of spectral gap for Schroedinger operators and Girsanov semigroups. Finally, we introduce background and mathematical framework of the mass gap (or spectral gap) problem on loop spaces; we give a survey on this problem and formulate some important open problems on loop spaces concerning this problem.