



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

Dipartimento di Scienze Fisiche,
Informatiche e Matematiche

Lunedì 29 luglio 2024 · dalle 14:00 alle
17:00

Dipartimento FIM · Via Campi 213/b, Modena – 41125 · Aula M2.4

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Poisson line Process and the Lévy Chentsov field

ABSTRACT

A Poisson line process is the image of a Poisson point process in the plane under the map $(a, b) \rightarrow (at + b)_{t \in \mathbb{R}}$. By associating a step with each line of the process, a random surface is obtained. Cutting the surface with vertical planes gives a one-dimensional continuous-time Markov process. The diffusive rescaling of the surface converges to a Gaussian process called the Lévy-Chentsov field.

The hard rod process is a classical traffic model where the plane is interpreted as time-space. Each quasi-particle has a length and travels ballistically until it collides with another quasi-particle, at which point they interchange positions. By identifying lines with the ballistic displacements of the quasi-particles and associating steps with jumps, one can show the law of large numbers, as well as the convergence of the fluctuations in the displacements of the quasi-particles to the Lévy-Chentsov field.