

# INSALATE DI MATEMATICA



## Mixing times of random walks on directed random graphs

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### IN THIS TALK

How long does it take to shuffle a deck of 52 cards? This simple question, has generated, in the last 40 years, an active research area in the field of discrete probability related to mixing times and the cutoff phenomenon. A cutoff is a dynamical phase transition for a random process, which appears as the size of the system becomes large: it occurs when the distance to equilibrium of the process abruptly drops from its maximum value to zero at a critical time scale. In this talk I will introduce the concept of mixing time of a Markov chain and present some results for the simple random walk on directed random graphs. Despite the randomness of the environment and the lack of reversibility, the cutoff can occur at a deterministic time.

 **words:** Markov chains, mixing times, cutoff, random graphs

