Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

Ergodicity in discrete-time quantum walks

Kiran Kumar

NYU, Abu Dhabi

Quantum walks are quantum analogues of random walks. In this talk, we present some results on ergodicity for homogeneous discrete-time quantum walks on integer lattices. In particular, we prove that the time-averaged probability measure associated with the quantum walk converges to the uniform distribution as the size of the graph grows to infinity.

We also prove several stronger results for dimension one, including the equivalence between the absolutely continuous spectrum of the unitary operator encoding the walk and the equidistribution of its dynamics in position space. In higher dimensions, we give a criterion for full and partial ergodicity in terms of a finer property of the spectrum which we dub `No Repeating Graphs'. We also present applications of our results to the ergodicity of eigenvectors for Schr\"{o}dinger operators on $\mathbb{Z}$-periodic graphs. This work is based on a joint work with Mostafa Sabri.

Thursday, May 7th 2026

11:30 Hrs (Tea / Coffee 11:15 Hrs)

Seminar Hall, TIFRH