Random walks on dynamic graphs

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We study random walks on dynamically changing graphs, where the set of vertices is fixed while the set of edges changes in each round. In particular, we focus on the case where the stationary distribution of the underlying sequence of graphs doesn't change over time and show that, when each graph in the sequence is connected, random walks on dynamic graphs behave essentially the same as random walks on connected static graphs. For example, we show that the mixing and hitting times of any sequence of d-regular connected graphs is $O(n^2)$, generalising a well-known result for static graphs. We also investigate properties of random walks on dynamic graphs that are not always connected: we relate their convergence to stationarity to the spectral properties of an average of transition matrices and provide some examples that demonstrate strong discrepancies between static and dynamic graphs.

Joint work with Thomas Sauerwald (arXiv:1903.01342, ICALP'19).