Quantum Walks on Graphs and Group State Transfer

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Let $G = (V, E)$ be a finite, simple, undirected graph on n vertices with adjacency matrix A. In the theory of quantum information, many recent papers have explored the continuous time evolution of an n-state quantum system with time-dependent evolution operator $U(t) = e^{iAt}$. For $S, T \subseteq V$ and $\tau \in \mathbb{R}$, we say G has (S, T)-*group state transfer* at time τ if $U(\tau)_{a,b} = 0$ whenever $b \in S$ and $a \notin T$. This is a generalization of *perfect state transfer* and *fractional revival*. In this talk, we provide examples as well as a basic theory of group state transfer.

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