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Perfect Laplacian state transfer in graphs

Let X be a graph with Laplacian matrix L. We study continuous quantum walks on X defined by the transition matrix $U(t) = \exp(itL)$. Assume that Y is a graph whose vertex set is equal to $V(X)$. The Laplacian state associated with Y is defined as $\frac{1}{2|E(Y)|}L(Y)$. Particularly, when K_2 (resp. K_3) is the unique non-trivial component of Y, we denote the Laplacian state associated with Y by pair state (resp. triangle state) of Y. In this talk, we investigate the existence of perfect Laplacian state transfer in threshold graphs and strongly regular graphs. Firstly, we characterize all connected threshold graphs having perfect pair state transfer. Then we prove that a strongly regular graph X on n vertices admits perfect pair state transfer (resp. perfect triangle state transfer) if and only if X is isomorphic to $\frac{n}{2}K_2$ or $\overline{\frac{n}{2}K_2}$. This is a joint work with Ada Chan, Qiuting Chen, Chris Godsil and Xiaohong Zhang.