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Pair-state transfer in distance regular graphs

In 2020, Chen and Godsil introduced pair-state transfer in the continuous-time quantum walk. In the joint work with Kim, Monterde, Ahmadi, Kirkland and Plosker, we studied a generalization called s-pair state transfer.

Let $U(t)$ be the transition matrix of the continuous-time quantum walk on a graph X, and let e_u denote the characteristic vector of a vertex u in X. We say *perfect s-pair state transfer* occurs at time τ if

$$U(\tau)\left(e_a + se_b\right) = \alpha\left(e_c + se_d\right),$$

for some vertices a, b, c, d in X. We can view perfect s-pair state transfer as the transfer of an entangled state on two qubits to another two qubits in the quantum spin network. In this talk, we focus on transfer in distance-regular graphs.