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Rank of Average Mixing Matrix in Dutch Windmill Graphs

Let X be a graph. We associate this graph with a continuous-time quantum walk by using a transition matrix $U(t) = \exp itA$, where A is the adjacency matrix. This allows us to create the average mixing matrix $\hat{M}$ which is time-independent and gives some sense of average probability values and long-term behavior. $\hat{M}$ has previously been studied on trees and graphs with distinct eigenvalues. Our focus is on Dutch Windmill graphs which all have repeated eigenvalues. In this talk we will show that $\hat{M}$ has "half-rank" and why, including the relationships between the spectra of Dutch Windmill graphs and path/star graphs.