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Local uniform mixing

Let X be a graph with adjacency matrix A, then the transition matrix for the continuous time quantum walk on X at time t is given by

$$U(t) = \exp(itA).$$

If for some time t, the j-th column of $U(t)$ is flat (all the entries of the column have the same modulus), then we say X admits local uniform mixing with respect to vertex j at time t. We construct an infinite family of graphs that admits local uniform mixing. They also serve as examples where local uniform mixing at vertex u does not necessarily occur at a rational multiple of the period if X is also periodic at vertex u. We also present some graphs that admit local uniform mixing with respect to several vertices at the same time, but those vertices are not in the same orbit.

This is joint work with Chris Godsil.