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Traces of average mixing matrices

A quantum walk is governed by its transition matrix which is unitary; since this process is necessarily non-ergodic and one cannot speak of a stationary distribution, we study the average behaviour of the quantum walk. The average of the mixing matrices contains relevant information about the quantum walk and about the graph. There has been a considerable amount of success in approaching questions about continuous-time quantum walks with tools in linear algebra and algebraic graph theory and we will discuss several recent works in this area, based on joint work with Chris Godsil and Mariia Sobchuk.