An Isospectral Flow on Banded Matrices and Its Optimality

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Abstract

In this talk, we discuss an isospectral flow in the space of matrices, which deforms any given real banded matrix with a simple real spectrum to a symmetric matrix. We prove that if the initial condition A_0 is banded matrix with lower bandwidth $p = 2$ and upper bandwidth $q = 0$ with simple real spectrum and second subdiagonal elements different from zero, then its omega-limit set is a pentadiagonal symmetric matrix isospectral to A_0 and it has the same sign pattern in the second subdiagonal elements as the initial condition A_0.

We provide some simulation results to highlight some aspects of this nonlinear system. As an application, we prove that this flow provides the solution of an infinite-time horizon optimal control problem.