

Renormalized Oscillation Theory for Hamiltonian Pencils

Alim Sukhtayev

Miami University, Oxford, USA
SUKHTAA@MIAMIOH.EDU

Abstract

Eigenvalue problems arising in hydrodynamics, quantum mechanics, and magnetohydrodynamics (MHD) often admit formulations as linear Hamiltonian systems with suitable boundary conditions. In many physically relevant settings, these systems involve singular boundary conditions and may depend nonlinearly on the spectral parameter.

In this talk, we present a general framework for analyzing a broad class of such systems. We obtain renormalized oscillation results through the Maslov index associated with suitably chosen paths of Lagrangian subspaces. We conclude by applying our framework to analyze the spectrum in each of our motivating examples.