

Seminar EDPs

Speaker: Marouane Assal (Pontificia Universidad Católica de Chile)

Title: Eigenvalue splitting of polynomial order for a system of Schrödinger operators with energy-level crossing.

Abstract: In this talk I will present recent results on the spectral analysis of a 1D semiclassical system of coupled Schrödinger operators each of which has a simple well potential. Such systems arise as important models in the Born-Oppenheimer approximation of molecular dynamics. Focusing on the cases where the two underlying classical periodic trajectories cross to each other which imply an energy-level crossing, we give Bohr-Sommerfeld type quantization rules for the eigenvalues of the system in both tangential and transversal crossing cases. Our main results consists in the eigenvalue splitting which occurs when the two action integrals along the closed trajectories coincide. The splitting is of polynomial order in the semiclassical parameter $\hbar$, of order $\hbar^{4/3}$ in the tangential case, and of order $\hbar^{3/2}$ in the transversal case, and the coefficients of the leading terms reflect the geometry of the crossing. This is a joint work with Setsuro Fujiié (Ritsumeikan University, Kyoto-Japan).

Martes 12 de enero a las 5pm.

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