Center for Applied Mathematics & Science

Department of Mathematics at UWG

Talk: The anharmonic oscillator in the complex plane
Speaker: Dr. Kwang Shin,
Time: Wednesday 3rd February at 4:00pm
Place: Room 301

Abstract: For the Schrodinger operator D^2+V in L^2(R), it is well-known that if V is real-valued, then the spectrum is real. Recently, I am interested in the converse of this statement, that is, assuming real spectra, what can we conclude about the potential V and the operator? In this talk, we will present a necessary and sufficient condition for the Schrodinger operators that have "almost real" spectra.

For anharmonic oscillators in the complex plane under various boundary conditions, we will present asymptotic expansions of the eigenvalues, and show that all except finitely many eigenvalues are real if and only if the oscillator itself or one of its translations is PT-symmetric.

Also, we will present an inverse spectral result, recovering polynomial potentials from the spectrum. For example, assuming that V is a polynomial, information on eigenvalues of –y”+V(x)y=\lambda y on [0,+\infty) with some unknown Robin boundary condition at x=0 and y(+\infty)=0 will explicitly determine the polynomial potential and the Robin boundary condition at x=0.

If time permits, we will talk about other interesting properties of eigenvalues of anharmonic oscillators.