Abstract

The spectrum of the Hill operator (one-dimensional periodic Schrödinger operator) $L = -d^2/dx^2 + v$ where $v \in L^2([0,\pi])$, has a band structure, that is, the intervals of continuous spectrum alternate with *spectral gaps*, or *instability zones*. The sizes of these zones decay, and the rate of decay depends on the smoothness of the potential. In the opposite direction, one can make conclusions about the smoothness of a potential based on the rate of decay of the instability zones. In this talk, together with main results in the literature, a Fourier method for studying the spectral properties of Hill operators will be presented.