

SOME NEW INVERSE EIGENVALUE PROBLEMS

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We will look at two quite different problems to recover the potential in a second order differential operator from information on its spectrum. The first concerns the classical equation $-u'' + qu = \lambda u$ with (say) the boundary condition $u(0) = 0$. At the other end point, $x = 1$ $u'(1) = \sqrt{\lambda}u(1)$. This problem has complex eigenvalues and we will show that a single such spectrum suffices to determine q .

In the second problem we have the equation $-u'' + \ell(\ell + 1)/x^2 + qu = \lambda u$ with fixed conditions at $x = 1$ and boundedness at $x = 0$. We examine the conjecture that two complete spectra $\{\lambda_{n,\ell}\}$ for $n = 1, 2, \dots$ and for ℓ equals two distinct values ℓ_1, ℓ_2 is sufficient to determine q .