

**Solnyshkin, S. N.**

**Asymptotic behaviour of eigenvalues of the one-dimensional Schrödinger operator in case that the potential tends to a non-summable one.** (Russian) [Zbl 0601.47041](#)

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A family of the operators  $H(t) = -d^2/dx^2 + V_t(x)$  is considered. Here the potentials  $V_t$  are locally summable and for  $t \rightarrow 0$  tend to the function  $V_0$  having a finite number of nonsummable singularities. It is shown that all eigenvalues, except, perhaps, few lower ones, approach for  $t \rightarrow 0$  the eigenvalues of the operator  $-d^2/dx^2 + V_0(x)$  with Dirichlet conditions at singular points. Other eigenvalues of the operators  $H(t)$  approach  $-\infty$  for  $t \rightarrow \infty$ . There exists a unique correspondence between these eigenvalues and the "attracting" singularities of the limiting potential for which the principal term of the asymptotic expression of the eigenvalue is proportional to the square of the integral of  $V(t)$  over the neighborhood of the singular point.

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**MSC:**

- [47F05](#) General theory of partial differential operators
- [35J10](#) Schrödinger operator, Schrödinger equation
- [47A10](#) Spectrum, resolvent

**Keywords:**

[nonsummable singularities](#); [Dirichlet conditions](#); [eigenvalues](#); [asymptotic expression](#)