Reviewer: M. Znojil

Theory Group, Nucl. Phys. Institute ASCR, 250 68 Řež, Czech Republic

Authors: Merad, M., Chetouani, L. and Bounames, A.

Short title: Boundary conditions for one-dimensional Feshbach-Villars equation

Publication: Physics Letters A 267 (2000) 225 - 231

Control number: 1 749 652

Primary classification: 81Q05

Secondary classification(s): 35P25

Review text:

Quantum relativistic partial differential equation for the Klein-Gordon wave function of a spinless particle $\Phi(x, t)$ is sometimes being formally replaced by the so called Feshbach-Villars equation of Schroedinger type. Even for the scalar external potentials the kinetic part of the related new, two-dimensional matrix Hamiltonian operator $H = T + eV(x)$ becomes non-Hermitian. The authors discuss the consequences, using an exactly solvable model $eV(x) \sim tanh\ x/2r$. This enables them to clarify the behaviour of the wave function near the origin even for the discontinuous model obtained in the limit $r \to 0$.