This is a review text file submitted electronically to MR.

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Short title: This line will be completed by the MR staff.

Control number: 1791948

Primary classification: 81Q60

Secondary classification(s): 81Q20 81V55 81U15 34E20 34L40

Review text:

There are two halves in this paper. The first one demonstrates that a certain potential is shape invariant. The second one asserts that this implies that one gets closed formulae for the bound-state energy spectrum as a consequence.

The first observation is trivial. A really elementary change of variables in the Eckart superpotential (available, e.g., in the reference [8] on p. 296) gives us its "new" proposed form [denoted as Z(r)], indeed.

The second statement is incorrect. The reason is quite subtle but, fortunately, I explained it, very recently and very explicitly, in Physical Review A 61 (2000) 066101. Its essence lies in the fundamental quantum mechanical necessity of an appropriate choice of the domain of definition for those Hamiltonians which are too singular. A deceitful ambiguity would be obtained otherwise (cf. J. Dittrich and P. Exner, J. Math. Phys. 26 (1985) 2000). A shorter, intuitive explanation is that one has to be really careful when speaking about boundary conditions in the origin in such a case.

Marginally, let me note that in the literature, the similar incorrect generalization appeared also some six years ago, in connection with the second possible solvable choice of the superpotential in s-wave (listed as a generalized Poeschl-Teller model on the same p. 296 of reference [8]). In this case the four-parametric model proved quasi-exactly solvable (cf. my comment in J. Math. Chemistry 19 (1996) 205 - 213). Hence, I would conjecture that the present four-parametric model can be also made quasi-exactly solvable.