This is a review text file submitted electronically to MR.

Reviewer: Znojil, Miloslav

Reviewer number: 13388

Address:
M. Znojil
UJF
250 68 Rez
Czech Republic
znojil@ujf.cas.cz

Author: This line will be completed by the MR staff.

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

Control number: 1863255

Primary classification: 81Q05

Secondary classification(s): 35Q40

Review text:

Mass of the driven harmonic oscillator is chosen as exponentially time-dependent. The weak, intermediate and strong time-dependence of this type means underdamping, critical damping and over-damping of the oscillations, respectively. A survey of the solutions in classical mechanics is offered in the Appendix as an introduction into the problem. Then, the discussion of the related quantum Schroedinger equations is performed in a way which employs and partially summarizes several previous results and publications by some of the present co-authors.

The key trick is that one searches for wave functions in an instantaneous basis formed by the eigenstates of a suitably selected quadratic auxiliary (called invariant) operator. Depending on the above-mentioned triple choice of the damping regime one then arrives at the formal solutions characterized by the real, continuous and continuous spectrum of energies, respectively. The corresponding wave functions are, similarly, represented in terms of Hermite polynomials, exponentials and functions of parabolic cylinder, respectively.

The notation is unfortunate (carrying all the constants with you all the time) and the text is repetitive (especially Summary) and, at the same time, insufficient (relying too much on the older work). It is also not clear why Section 3 is added listing all the possible formulae for the two-time path-integral-related propagators and all the well known completeness relations for the different bases. All these details make the reading of this text a comparatively unpleasant experience, which is particularly regrettable in the light of both its physical relevance and its rich mathematical contents (both being mostly revealed just in a fairly

implicit form).