

This is a review text file submitted electronically to MR.

Reviewer: Znojil, Miloslav

Reviewer number:

Address:

NPI ASCR, 250 68 Rez,
Czech Republic
znojil@ujf.cas.cz

Author: Mostafazadeh, Ali

Short title: A Hamiltonian formulation of the Pais-Uhlenbeck oscillator that yields a stable and unitary quantum system.

MR Number: 2737899

Primary classification: 81Q80

Secondary classification(s): 81Q65 81Q12

Review text:

In a way invented when AM played chess with his daughter (and motivated by the puzzles posed by the higher-derivative theories, e.g., of gravity), the benchmark Pais-Uhlenbeck oscillator is considered in both the non-degenerate case (where the frequencies differ) and in the degenerate case (where the frequencies coincide). In the former case the non-quantum system is assigned an alternative, amended classical Hamiltonian leading to the standard canonical quantization recipe in which the quantum Hamiltonian operator proves Hermitian, with the positive spectrum bounded from below. This offers an alternative and amendment of the quantization recipe of Ref. [5] (which was marred by certain anomalous features, especially when the quantum - classical correspondence is concerned). In the second half of the letter the more difficult degenerate case is shown complex. A real description of this complex system and certain properties of its possible quantizations are discussed. A number of arguments is given supporting its expected (and expectable) instability.