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Propagator with friction in Quantum Mechanics

A. Jannussis, G. Brodimas and **A. Streclas**

Department of Theoretical Physics, University of Patras, Patras, Greece

Abstract

In this paper we calculate the propagator for some quantum - mechanical systems with friction. The friction is a linear function of the velocity with friction constant γ and the system looks like a system with time dependent mass of the form $m \rightarrow me^{\gamma t}$.

With the help of the following formula:

$$K(q'', t'', q', t') = \sum_n \Psi^*(q', t')\Psi(q'', t''))$$

we can calculate the exact propagators of some systems with quadratic Hamiltonians. Especially we study the forced and damped harmonic oscillator in a uniform electromagnetic field.