

PSEUDO-FERMIONIC COHERENT STATES*

OMAR CHERBAL and MAHREZ DRIR

*Theoretical Physics Laboratory, Faculty of Physics USTHB
B.P 32 El-Alia, Bab Ezzouar, 16111 Algiers, Algeria*

Abstract. We have generalized the fermionic coherent states to pseudo-fermion oscillator system. The system of coherent states constructed consist of two subsets, which are bi-normalized and bi-overcomplete. The two subsets are built up as eigenstates of two annihilation operators b and $\tilde{b} = \eta b \eta^{-1}$ of respectively H and H^+ where η is the Hermitian and invertible operator that ensures the pseudo-Hermiticity of the Hamiltonian $H = \eta^{-1} H^+ \eta$.

1. Introduction

The coherent states which provide a quantum description of the evolution of a classical system [4] has been generalized to several quantum systems [9, 12]. In last years the concept of coherent states was also introduced to non-Hermitian quantum mechanics [1, 10]. In this perspective, we have constructed in a recent paper [3] pseudo-fermionic coherent states for pseudo-Hermitian two-level Hamiltonians with real spectrum.

Our aim is to develop the ideas of [3] in the case of the single pseudo-fermion or called “phermion” oscillator described by the Hamiltonian $H = \omega(b^\# b - \frac{1}{2})$. First we start with a review in Section 2 of some main results on the pseudo-Hermiticity. In Section 3 we construct pseudo-fermionic or “phermionic” coherent states for the single phermion oscillator. In Section 4 we study the time evolution of coherent states constructed. The paper ends with concluding remarks.

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