



## PSEUDO-FERMIONIC COHERENT STATES

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**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  $\eta$  is the Hermitian and invertible operator that ensures the pseudo-Hermiticity of the Hamiltonian  $H = \eta^{-1} H^+ \eta$ .

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### 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 develops 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.

### 2. Some Main Results on Pseudo-Hermiticity

By definition [5], an Hamiltonian  $H$  is called *pseudo-Hermitian* if it satisfies the relation

$$H^+ = \eta H \eta^{-1} \tag{1}$$