2001 Vol.35 No.1 pp.15-18 DOI:

Solving Quantum-Nonautonomous System with Non-Hermitian Hamiltonians by Algebraic Method

WEI Lian-Fu[1,2] and WANG Shun-Jin[3,4]

[1] Department of Applied Physics, Shanghai Jiao Tong University, Shanghai 200030, China
[2] State Key Laboratory of Functional Materials for Informatics, Shanghai Institute of Metallurgy, The Chinese Academy of Sciences, Shanghai 200050, China
[3] Institute of Modern Physics, Southwest Jiao Tong University, Chengdu 610031, China
[4] Department of Modern Physics, Lanzhou University, Lanzhou 730000, China
(Received: 1999-9-28; Revised:)

Abstract: A convenient method to exactly solve the quantum-nonautonomous systems with non-Hermitian Hamiltonians is proposed. It is shown that a nonadiabatic complete biorthonormal set can be easily obtained by the gauge transformation method in which the algebraic structure of systems has been used. The nonunitary evolution operator is also found by choosing a special gauge function. All auxiliary parameters introduced in the present approach are only determined by some algebraic equations. The dynamics of two quantum-nonautonomous systems ruled by non-Hermitian Hamiltonians, including a two-photon ionization process involving two-state only and a mesoscopic RLC circuit with a source, are treated as the demonstration of our general approach.

PACS: 03.65.-w, 32.80.Wr
Key words: non-Hermitian quantum-nonautonomous system, mesoscopic RLC circuit with a source

[Full text: PDF]

Close