Finite Element Method for the Simulation of Single-Excitation States in Quantum Optics: Codes Matlab

YASMINA BEGHRICHE[1]

[1]*University Constantine 2, Abdelhamid Mehri, Constantine 25 000, Algeria.*

E-mail: yasmina.beghriche@univ-constantine2.dz

Abstract. In this work, we present the finite element method for solving the phenomenon of collective spontaneous emission in a two-level atomic system containing a single photon. In the next section, we present our discrete prolem as an integro-differential equation for the atomic degrees of freedom with all conditions by using as local partial differential equation, which describes the phenomenon of collective spontaneous emission in a two-level atomic system containing a single photon. Finally, we present some numerical tests that validate our theoretical results. These numerical tests help verify convergence rates and prove the practical reliability of a theoretical approach.

Keywords

Nonlocal partial differential equations; Volterra integro-differential equations; Finite element method, Numerical schemes, Codes Matlab.

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