

## Multi-pulse Chaotic Dynamics of a Composite Laminated Plate

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**Abstract** In this paper, the multi-pulse chaotic dynamics of a simply-supported symmetric cross-ply composite laminated rectangular plate with the parametric and forcing excitations is investigated. The non-autonomous nonlinear dynamical system of the plate with strong couplings is considered. The formulas of the simply-supported composite laminated rectangular plate are derived by using Hamilton's principle and the Galerkin's approach. They are non-autonomous ordinary differential two degree of freedom equations with square terms and cube terms. The extended Melnikov method is improved to enable us to analyze directly the non-autonomous nonlinear dynamical system, which is applied to the non-autonomous governing equations of motion for the simply-supported composite laminated rectangular plate. The results obtained here indicate that multi-pulse chaotic motions can occur in the simply-supported composite laminated rectangular plate. Numerical simulation is also employed to find the multi-pulse chaotic motions of the simply-supported composite laminated rectangular plate.

**Keywords:** Composite laminated plate, strong coupling, non-autonomous nonlinear system, multi-pulse chaotic dynamics