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New Symmetric Periodic Solutions for the Maxwell-Bloch Differential System

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Abstract
We provide sufficient conditions for the existence of a pair of symmetric periodic solutions in the Maxwell-Bloch differential equations modeling laser systems. These periodic solutions come from a zero-Hopf bifurcation studied using recent results in averaging theory.

Keywords Maxwell-Bloch · Averaging theory · Periodic solutions · Zero-Hopf bifurcations

Mathematics Subject Classification (2010) 34C29 · 37C27

1 Introduction and Statement of the Main Result

In nonlinear optics the Maxwell–Bloch equations are used to describe laser systems. These equations were obtained by coupling the Maxwell equations with the Bloch equation (a linear Schrödinger like equation which describes the evolution of atoms

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