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MAXWELL–BLOCH EQUATIONS WITH A QUADRATIC CONTROL ABOUT Ox_1 AXIS

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Abstract. The Maxwell–Bloch equations with one quadratic control about Ox_1 axis are introduced and some of their dynamical and geometrical properties are pointed out.

1. Introduction

The Maxwell–Bloch equations with one control about Ox_1 axis can be written in the following form:

$$\begin{cases} \dot{x}_1 = x_2 + u_1 \\ \dot{x}_2 = x_1 x_3 \\ \dot{x}_3 = -x_1 x_2 \, . \end{cases} \tag{1.1}$$

In all that follows we shall employ the quadratic feedback:

$$u_1 = -k x_2 x_3 \tag{1.2}$$

where $k \in \mathbb{R}$ is the feedback gain parameter. We shall refer to the system (1.1), (1.2) as the controlled system.

The goal of our paper is to point out some geometrical and dynamical properties of this system.