Hidden Oscillations in the Mathematical Model of the Optical Binary Phase Shift Keying (BPSK) Costas Loop

Authors : N. V. Kuznetsov, O. A. Kuznetsova, G. A. Leonov, M. V. Yuldashev, R. V. Yuldashev
Abstract : Nonlinear analysis of the phase locked loop (PLL)-based circuits is a challenging task. Thus, the simulation is widely used for their study. In this work, we consider a mathematical model of the optical Costas loop and demonstrate the limitations of simulation approach related to the existence of so-called hidden oscillations in the phase space of the model.