# Investigation on Dynamics of the Extended Duffing-Van der Pol System

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The chaotic motion in periodic self-excited oscillators has been extensively investigated through experiments and computer simulations. However, with the advent of the study of chaotic motion by means of strange attractors, Poincaré map, fractal dimension, it has become necessary to seek for a better understanding of nonlinear system with higher order nonlinear terms. In this paper we consider an extended Duffing-Van der Pol oscillator by introducing a nonlinear quintic term. The dynamical behaviour of the system is investigated by using Melnikov analysis and numerical simulation. The results can help one to understand the essence of given nonlinear system.

*Key words:* Extended Duffing-Van der Pol Oscillator; Bifurcation; Chaos.