NOTES ON A MODIFIED PLANAR MODEL: INTRINSIC PROPERTIES, SIMULATIONS, SOME MODULES IMPLEMENTED IN CAS MATHEMATICA

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Abstract. *A number of authors devote their research to the phase-space flow of a particle in a forced cubic potential with a specific Hamiltonian. In this paper, we focus on the Hamiltonians, which gives rise to the following modified dynamical system:*

$$\begin{cases} \dfrac{dx}{dt} &= y \\ \dfrac{dy}{dt} &= -x + x^2 + \epsilon(-x + x^2)\displaystyle\sum_{j=1}^{N} g_j \cos(j\omega t) \end{cases}$$

where $0 \leq \epsilon < 1$, $g_i \geq 0$, *and* N *is integer. This will be included as an integral part of a planned much more general Web-based application for scientific computing. Some investigations in the light of Melnikov's approach is considered. From Propositions 1–3 the reader may formulate the Melnikov's condition for chaotic behavior of the dynamical model. The proposed new modification, contain many free parameters (the coefficients* $g_i; i = 1, 2, \ldots, N$*), which makes it attractive for use in mechanics, chemistry and engineering sciences.*

Key words: Modified planar model, Melnikov function, chaos.

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