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## JUMP RESONANCE IN THE QUINTIC DUFFING OSCILLATOR

BY

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**Abstract.** Jump resonance is one of the specific phenomena, which characterize the behavior of nonlinear systems. This phenomenon is best illustrated in the frequency response, and consists of the occurrence of multiple values of the output signal's amplitude and phase for the same values of the amplitude or frequency of the input signal. Moreover, the modification of some of the system's parameters as a result of some perturbation may lead to the occurrence of resonant jumps in the system. We must add that in this functioning regime the stability of the system is lost, therefore it is of the outmost importance to determine the parameters' domain of values for which this phenomenon takes place, aiming to employ a control method to ensure the system's stability.

The analysis of nonlinear systems in harmonic forced regime has led to the development of some analytical and graphical-analytical methods to identify the jump resonance phenomenon. One of these methods is illustrated in this paper, applied to a Duffing type oscillator of fifth order.

**Keywords:** Duffing equation, damping, jump resonance, describing function.