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# White noise perturbation of the autoresonance model

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## Abstract

A system of two first-order ordinary differential equations describing the initial stage of a capture into a resonance in forced nonlinear oscillatory systems is considered. Unboundedly growing solutions in time at infinity correspond to autoresonance phenomenon. By the reason of the nonlinearity of the considered equations the explicit formulas for the solutions cannot be obtained. However, it is possible to construct an asymptotic expansion for some particular solutions in the form of power series. We study the stability of such solutions under perturbations of white noise type. Analysis of stability is based on the construction an appropriate Lyapunov function. We propose a method for constructing of such functions that can be used for more general nonlinear systems.

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