

On stability boundaries of periodical systems

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ABSTRACT

Singular and regular points of the stability boundaries for systems of linear differential equations with coefficients, dependent periodically on time and smoothly depending on one, two, or three parameters, are classified. Classification is based on the theory of versal deformations of real matrices. Bifurcations of simple and multiple multipliers of the system near regular and singular points of the stability boundary are studied. A constructive method of finding approximation of the stability domain in the vicinity of regular or singular points of the boundary is proposed. The method uses eigenvectors and associated vectors of the monodromy matrix, first derivatives of the system matrix with respect to parameters, and matriciants calculated at the point under consideration. As an example stability of a tube conveying pulsating fluid is considered. Approximations of the stability domain near regular and singular points of its boundary are found using the suggested method.

Keywords: *stability domain, parametric resonance, singularity, multiplier, bifurcation*

Mathematics Subject Classification: *70J40, 34D*

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