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On the stability of nonconservative systems with small dissipation. (English)

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Summary: We study the paradoxical influence of small dissipative and gyroscopic forces on the stability of linear nonconservative systems consisting of the nonpredictable (at first glance) behavior of a critical nonconservative loading. By studying bifurcations of multiple roots of the characteristic polynomial of the nonconservative system considered, we obtain an analytical description of this effect. The model of a disk brake describing the appearance of a creak in the braking of a car is considered as a mechanical example.

Keywords : gyroscopic forces; critical loading; bifurcations; disk brake
Classification :
∗70E50 Stability problems
70J25 Stability of linear oscillatory motions