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Invariant planes, indices of inertia, and degrees of stability of linear dynamic equations.

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Summary: We analyze spectral properties of linear dynamic equations linearized at equilibrium points. The analysis involves a search for invariant planes that are uniquely projected onto the configuration plane. In turn, the latter problem reduces to the solution of a quadratic matrix equation of special form. Under certain conditions, the existence of two different solutions is proved by the contraction mapping method. An estimate for the degree of stability is obtained in terms of the index of inertia of potential energy.

MSC:

70J25 Stability for problems in linear vibration theory

Keywords:

quadratic matrix equation; existence; contraction mapping method

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