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**New Lyapunov-Krasovskii functionals for stability of linear retarded and neutral type systems.** (English) [Zbl 0974.93028](#)

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Summary: A new (descriptor) model transformation and a corresponding Lyapunov-Krasovskii functional are introduced for stability analysis of systems with delays. Delay-dependent/delay-independent stability criteria are derived for linear retarded and neutral type systems with discrete and distributed delays. Conditions are given in terms of linear matrix inequalities and for the first time refer to neutral systems with discrete and distributed delays. The proposed criteria are less conservative than other existing criteria (for retarded type systems and neutral systems with discrete delays) since they are based on an equivalent model transformation and since they require bounds for fewer terms. Examples are given that illustrate advantages of our approach.

**MSC:**

- 93C23 Control/observation systems governed by functional-differential equations
- 93D20 Asymptotic stability in control theory
- 93B17 Transformations
- 15A39 Linear inequalities of matrices

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**Keywords:**

time-delay systems; stability; linear matrix inequalities; delay-dependent/delay-independent criteria; transformation; neutral systems; distributed delays; discrete delays

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