

Absolute stability of control systems described by difference differential equations

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Abstract

Problems of absolute stability for nonlinear control systems described by difference differential equations with time delay and a neutral type are considered in the report. Control systems are understood as systems of difference differential equations with an asymptotically stable linear part and a nonlinearity lying in the given sector. The second Lyapunov's method is used. As it is known, for difference differential systems the second Lyapunov's method is used in two ways: the method of finite-dimensional Lyapunov's functions with the Razumihin's condition and the method of Lyapunov-Krasovskys functionals. The Lyapunov's functions are presented as a sum of a quadratic form and an integral of the nonlinearity. The functionals are constructed in the similar form with adding an integral component of quadratic form of an aftereffect.

The constructive conditions of absolute stability are obtained; the factors of exponential damping of solutions are calculated.

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