STABILITY CONDITION OF DISTRIBUTED DELAY SYSTEMS
BASED ON AN ANALYTIC SOLUTION TO LYAPUNOV
FUNCTIONAL EQUATIONS

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ABSTRACT

An analytic solution to Lyapunov functional equations for distributed delay systems is derived. The analytic solution is computed using a matrix exponential function, while conventional computation has been relied on numerical approximations. Based on the analytic solution, a necessary and sufficient stability condition for distributed delay systems with unknown but bounded constant delay is proposed.

KeyWords: Time delay systems, stability, Lyapunov function.