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Exponential Stability And Instability In Finite Delay Nonlinear Volterra Integro-differential Equations. Preliminary report.

Lyapunov functionals are employed to obtain sufficient conditions that guarantee asymptotic stability of the nonlinear Volterra Integro-differential equation with uniformly distributed delay

$$x'(t) = - \int_{t-r}^t a(t, s)g(x(s))ds,$$

where the functions $a(t, s)$ and $g(x)$ are continuous on their respective domains and $r > 0$. In addition, we will obtain criteria for instability. (Received January 30, 2010)