



# $H_\infty$ Filter Design for a Class of Nonlinear Neutral Systems with Time-Varying Delays

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**Abstract:** In this note, the problem of  $H_\infty$  filtering for a class of nonlinear neutral systems with delayed states and outputs is investigated. By introducing a descriptor technique, using Lyapunov-Krasovskii functional and a suitable change of variables, new required sufficient conditions are established in terms of delay-dependent linear matrix inequalities (LMIs) for the existence of the desired  $H_\infty$  filters. The explicit expression of the filters is derived to satisfy both asymptotic stability and a prescribed level of disturbance attenuation for all admissible known nonlinear functions. A numerical example is provided to show the proposed design approach.

**Keywords:** *neutral systems;  $H_\infty$  filtering; nonlinearity; LMI; time-delay.*

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