



H_∞ Filter Design for a Class of Nonlinear Neutral Systems with Time-Varying Delays

Hamid Reza Karimi *

*Institute of Mechatronics, Department of Engineering, Faculty of Technology and Science,
University of Agder, N-4898 Grimstad, Norway*

Received: February 18, 2008; Revised: March 6, 2009

Abstract: In this note, the problem of H_∞ 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_∞ 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_∞ filtering; nonlinearity; LMI; time-delay.*

Mathematics Subject Classification (2000): 34K40, 93C10, 93E11.