

TDS 2019

**L2 and BIBO-stability of systems with variable delays**

Catherine Bonnet

Inria Saclay-Île-de-France  
L2S – CentraleSupélec  
3 rue Joliot Curie  
91192 Gif-sur-Yvette cedex  
France

and

Jonathan R. Partington  
School of Mathematics  
Leeds University  
Leeds LS2 9JT  
U.K.

There has been a growing interest in systems with time-varying delays in recent years and to the best of our knowledge, no study has been made of the input–output stability of a standard feedback scheme involving a system with time-varying delays. We consider here two versions of input–output stability: so-called  $H_\infty$  and BIBO-stability. Retarded and neutral type systems with pointwise or distributed delays are studied here. We perform a stability analysis and discuss feedback stabilization. The results we derive yield very explicit estimates for stability margins, as will be seen by considering the examples we present.