Finite-time stabilization of hyperbolic systems on tree-shaped networks

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We investigate the finite-time boundary stabilization of a 1-D first order quasilinear hyperbolic system of diagonal form on [0,1]. The dynamics of both boundary controls are governed by a finite-time stable ODE. The solutions of the closed-loop system issuing from small initial data in Lip([0,1]) are shown to exist for all times and to reach the null equilibrium state in finite time. When only one boundary feedback law is available, a finite-time stabilization is shown to occur roughly in a twice longer time. The above feedback strategy is then applied to the Saint-Venant system for the regulation of water flows in a network of canals.
This is a joint work with Vincent Perrollaz (University of Tours).