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Constrained Stabilization of a Dynamic Systems: A Case Study.

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Abstract: In this work we consider the problem of determining and implementing a state feedback stabilizing control law for a laboratory two-tank dynamic system in the presence of state and control constraints. We do this by exploiting the properties of the polyhedral Lyapunov functions, i. e. Lyapunov functions whose level surfaces are polyhedra, in view of their capability of providing an arbitrarily good approximation of the maximal set of attraction, which is the largest set of initial states which can be brought to the origin with a guaranteed convergence speed.

We will first recall the basic theoretical background necessary for the scope and then we will report and analyze the results of the practical implementation on a two-tank laboratory system of a linear variable-structure and a quantized control law proposed in literature. Finally an heuristic procedure for the determination of a static linear gain will be presented.

Keywords:

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