

# Online Implementation of a Robust Controller using Hybrid Global Optimization Techniques

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## Abstract

In this work, we report the experimental implementation of a robust controller designed *online* using hybrid global optimization and constraint propagation techniques. The hybrid global optimization combines interval global optimization and nonlinear local optimization methods. The constraint propagation techniques are very effective in discarding infeasible controller parameter regions in the optimization search. The experimental setup used in this work consists of a coupled tank process with the manipulated and control variables as the flow rate into the first tank and the level in the second tank, respectively. The flow rate into the first tank is varied by changing the input voltage to a variable speed pump, and the level of the water in the second tank is measured using resistive level sensor. The control design algorithm is implemented on a PC in FORTRAN 95 with interval arithmetic support. The PC is connected to the coupled tank process via Advantech's Adam-5000 data acquisition system. The obtained experimental results show the effectiveness of hybrid global optimization for the *online* design of robust control systems.