

This paper proposes a proportional-integral extremum-seeking control technique. The technique is a generalization of the standard perturbation based techniques which provides fast transient performance of the closed-loop system to the optimum equilibrium of a measured cost function. Under the assumption that the equations describing the dynamics of the nonlinear system and the cost function to be minimized are unknown, it is shown that, for a class of minimum-phase nonlinear system with a cost function of relative degree one, the closed-loop ESC can practically stabilize the unknown equilibrium optimum. The stabilization result provides an alternative approach to output feedback control of nonlinear systems. The effectiveness of the proposed approach is demonstrated using simulation examples.