

UNCERTAINTY AND DISTURBANCE ESTIMATION BY USING PROPORTIONAL INTEGRAL OBSERVER

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Abstract

Many modern control designs require complete state vector for their implementation. When complete state vector is not available through measurements, it becomes necessary to estimate the same by using observers. The traditional observer such as the Luenberger observer does this job quite satisfactorily provided the system model is known accurately, a requirement which is rarely satisfied by real life systems. Thus state estimation of uncertain systems is an important problem and one approach which addresses it is the Proportional Integral Observers (PIO). The PIO is an observer in which an additional term, which is proportional to the integral of the output estimation error, is added in order to achieve some desired robustness performance. In fact, the addition of an integral term permits one to obtain additional degrees of freedom for control or observer design purposes. In particular, this additional degree of freedom can be used for recovering stability margins of traditional controllers. The objective of this work is to study the PIO and estimate uncertainty to real life systems. It is intended to demonstrate effectiveness of the design through simulations.