Abstract:
In this paper, a novel architecture for model following control of uncertain Linear Time Invariant (LTI) systems in case of state feedback is presented. The architecture is based on a Modified Linear Extended State Observer (MLESO), which estimates the disturbance signal that causes the real plant to deviate from the reference model. Unlike conventional Linear Extended State Observers, the MLESO is derived by shaping the transfer function from the unknown disturbance to the known disturbance estimate output. By virtue of an appropriate control law, the disturbance estimate is used to compensate the model following error. In contrast to similar approaches such as Model Reference Adaptive Control or several variants of L1 Adaptive Control, the presented approach does not rely on a nonlinear or hybrid control law, but may be realized as a continuous time, LTI system. While nonlinear adaptive control laws may certainly outperform linear control laws in appropriate conditions, the certification of adaptive control laws remains an open problem until today. For this reason, linearity is seen as a major advantage of the presented architecture.