Abstract

Presented is a digital control algorithm that can be universally applied to all linear systems. No prior knowledge about the system is required other than a rough estimate of the system's order. The algorithm uses an on-line Kalman modeler and is thus capable of adapting to the system as it varies over time. In order to ensure optimal performance, a novel matrix based system formulation is also presented so that a linear optimizer may be used in tandem with the Kalman modeler. The proposed algorithm is tested on simulations of an airplane's roll system and the effects of the various parameters are examined. Based on the results of the simulations, it has been found that the proposed algorithm outperforms standard PID control in most scenarios, and is capable of adapting to the system as its gain and poles vary over time, even in the presence of noise.