(1)

DETERMINATION OF ALL STABILIZING PI CONTROLLERS FOR LINEAR TIME INVARIANT SYSTEMS

Noha Medhat Mohamed Darwish

Abstract:

This paper considers the problem of controlling a given linear time invariant (LTI) system described by a rational transfer function using a PI controller. A method based on graphical and computational tools has been proposed. This method specifies a PI controller (Kp and Ki) that satisfies both frequency domain specifications (a specified gain or phase margin) and minimum integral time absolute error (ITAE).

Keywords:

ITAE, LTI, Optimal gain and phase margins, PI controller, Robustness, Stabilizing region.

Published In:

Journal of Engineering Sciences , Vol. 41, No.5 , pp. 1877-1889

(2)
Discretization of Closed-Loop Systems

Awad I. Saleh ; Mohamed M. M. Hasan and Noha M. M. Darwish

Abstract:

The problem of converting existing continuous-time (CT) control systems into digital control systems is considered. The objective of this paper is to review, modify and compare three methods to obtain the discrete-time (DT) controller that take the closed-loop behavior into consideration. The first method is the partial compensation for ZOH effect method, it enhances the performance of discretized controllers in order to partially compensate the ZOH effect of the closed-loop digital control system, and to preserve the stability of the closed-loop digital control system. A modified approach is considered to improve the stability of the closed-loop digital system. The second method is the frequency response matching method, it is based on matching the frequency response of the digital control system to that of the continuous system with a minimum weighted mean-square error in the w-domain to obtain the parameters of the DT-controller. The third method is the plant input method, it is an indirect design method, which guarantees a stable control system when the DT-controllers are used to replace the CT-controllers. In this method the stability is assured for any sampling period used in pratice and even for unstable plants.

Published In:

Journal of Engineering Sciences , Vol. 34, No. 1 ,

(3)

PID controller design in the frequency domain for time-delay systems using direct method

Darwish, Noha Medhat

Abstract:

NULL

Keywords:

NULL

Published In:

Transactions of the Institute of Measurement and Control , v 40, n 3 , p 940-950