Improved Simultaneous Performance in the Time Domain and in the Frequency Domain

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Abstract : An innovative approach for controlling unstable and invertible systems has demonstrated superior performance compared to conventional controllers. It has been successfully applied to a levitation system and drone control. Simulations have yielded satisfactory performances when applied to a satellite antenna controller. This design method, based on sensitivity analysis, has also been extended to handle multivariable unstable and invertible systems that exhibit dominant diagonal characteristics at high frequencies, enabling decentralized control. Furthermore, this control method has been expanded to the realm of adaptive control. In this study, we introduce an alternative adaptive architecture that enhances both time and frequency performance, helpfully mitigating the effects of disturbances from the input plant and external disturbances affecting the output. To facilitate superior performance in both the time and frequency domains, we have developed user-friendly interactive design methods using the GeoGebra platform.

Keywords : control theory, decentralized control, sensitivity theory, input-output stability theory, robust multivariable feedback control design

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