Adaptive low-gain integral control for well-posed linear systems

S Townley

School of Mathematical Sciences
University of Exeter UK

Abstract

Low-gain integral control is a well-established control methodology. Loosely speaking - closing the loop around an integrator k/s, with integrator gain k, in series with a stable system, with transfer function $\mathbf{G}(s)$, achieves asymptotic tracking of constant reference signals if all the eigenvalues of $\mathbf{G}(0)$ have negative real part and the integrator gain is positive and small enough (hence 'low-gain'). In fact one can show that low-gain integral control works if and only if $\mathbf{G}(s)$ is a stable well-posed (inifinite-dimensional systems) and all the eigenvalues of $\mathbf{G}(0)$ have negative real part. In this talk we show that these necessary conditions are actually sufficient for low-gain integral control if the gain k is obtained adaptively.