

2-4.5 Response of a Lead-Lag Unit

A device that is commonly used for dynamic compensation in feedforward controllers, known as a lead-lag unit, has the following transfer function:

$$Y(s) = \left[\frac{\tau_{ld}s + 1}{\tau_{lg}s + 1} \right] X(s)$$

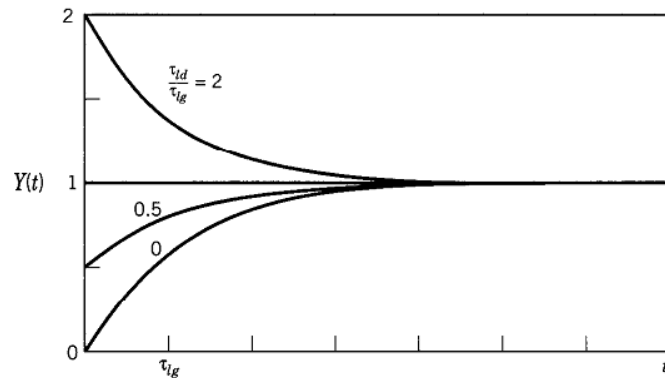


Figure 2-4.5 Lead-lag response to a unit step change.

Step Response

$$Y(s) = u(t) + \left(\frac{\tau_{ld}}{\tau_{lg}} - 1 \right) e^{-t/\tau_{lg}}$$

Ramp Response

Impulse Response

Pulse Response