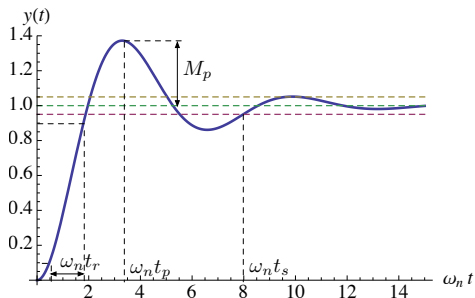


Formulas for TD Specs: Overshoot & Peak Time



t_p is the *first time* $t > 0$ when $y'(t) = 0$

$$y(t) = 1 - e^{-\sigma t} \left(\cos(\omega_d t) + \frac{\sigma}{\omega_d} \sin(\omega_d t) \right)$$

$$y'(t) = \left(\frac{\sigma^2}{\omega_d} + \omega_d \right) e^{-\sigma t} \sin(\omega_d t) = 0 \text{ when } \omega_d t = 0, \pi, 2\pi, \dots$$

$$\text{so } t_p = \frac{\pi}{\omega_d}$$