



IIT ROORKEE



NPTEL ONLINE
CERTIFICATION COURSE

TRANSIENT RESPONSE ANALYSIS

SECOND ORDER SYSTEM

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GENERAL SECOND ORDER SYSTEM

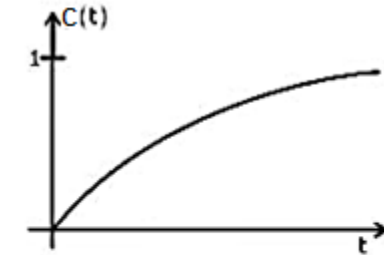
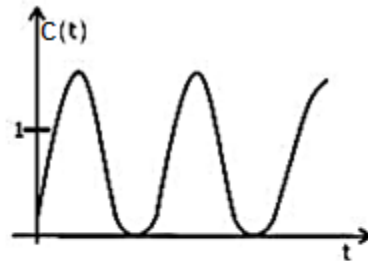
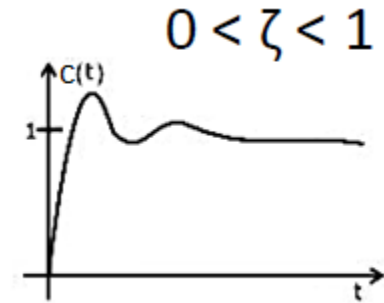
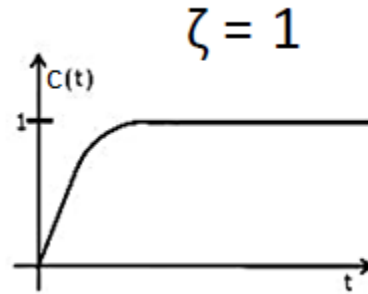
- A general second-order system is characterized by the following transfer function:

$$G(s) = \frac{b}{s^2 + as + b}$$

$$G(s) = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$$

RESPONSE OF SECOND ORDER SYSTEM

- $\zeta = 0$: Undamped
- $0 < \zeta < 1$: Underdamped
- $\zeta = 1$: Critically damped
- $\zeta > 1$: Overdamped



REFERENCE BOOKS

- Norman S. Nise, Control Systems Engineering, Wiley, 2013
- Katsuhiko Ogata, Modern Control Engineering, Prentice Hall, 2010.

