

$$ay'' + by' + cy = Ct^m e^{rt}$$

$$y(t) = t^s (A_m t^m + \cdots + A_1 t + A_0) e^{rt}$$

$$\begin{cases} s = 0 & r \text{ is not a root of the aux. equation} \\ s = 1 & r \text{ is a simple root of the aux. equation} \\ s = 2 & r \text{ is a double root of the aux. equation} \end{cases}$$

$$ay'' + by' + cy = Ct^m e^{\alpha t} \sin(\beta t)$$

or

$$ay'' + by' + cy = Ct^m e^{\alpha t} \cos(\beta t)$$

$$y(t) = t^s (A_m t^m + \cdots + A_1 t + A_0) e^{\alpha t} \cos(\beta t) \\ + t^s (B_m t^m + \cdots + B_1 t + B_0) e^{\alpha t} \sin(\beta t)$$

$$\begin{cases} s = 0 & \alpha + \beta i \text{ is not a root of the aux. equation} \\ s = 1 & \alpha + \beta i \text{ is a root of the aux. equation} \end{cases}$$