$$(D - rI)(f(t)e^{rt}) = f'(t)e^{rt}$$

$$D(f(t)e^{rt}) - f(t)re^{rt}I$$

$$f'(t)e^{rt} + re^{rt}f(t) - f(t)re^{rt} = \checkmark$$

$$(D-2I)^3 = D^3 \quad 3D^2 2I \quad 3D(2I)^2 \quad (2I)^3$$

$$D^3 \quad 6D^2 I \quad 12DI \quad 8I$$

$$p'''(x) \quad p''(x)x \quad 12p'(x)x \quad 8x$$

$$D^3 - 6D^2 + 12D - 8I$$

$D^2 I \to p''(x)x$?

$$\ker((D-2I)^3)$$

$$(D-2I)^3 p(x) = 0$$

$$D^3(p(x)) - 6D^2 I(p(x)) + 12DI(p(x)) - 8Ip(x)$$

Ae^{rt}

$$p'''(x) - 6p''(x) + 12p'(x) - 8p(x) = 0$$

$$r^3 - 6r^2 + 12r - 8 = 0$$

$$p'(x) - 2p(x) = 0$$

$$p'(x) = 2p(x)$$

$$p(x) = Ae^{rt}$$

$$r - 2 = 0$$

$$r = 2$$

$p(x) = Ae^{2t}$ & repeated root