

$$ax^2y'' + bxy' + cy = 0$$

→ Euler equation $y = x^p$ $y = y(x)$

$$u = u(r, \theta, t) \quad \text{PDE}$$

$$y = x^p$$

$$y' = p x^{p-1}$$

$$y'' = p(p-1)x^{p-2}$$

Guess

$$y = x^p$$

General solution

$$y = C_1 x^{-3} + C_2 x^2$$

$$x^2 p(p-1)x^{p-2} + 2x p x^{p-1} - 6x^p = 0$$

$$p(p-1)x^p + 2p x^p - 6x^p = 0$$

$$x^p [p^2 - p + 2p - 6] = 0$$

$$p^2 + p - 6 = 0$$

$$(p+3)(p-2) = 0$$

$$p = -3, 2$$

$$\textcircled{1} \text{ a) } r^2 + 25 = 0 \quad \text{b) } y = C_1 e^{-2t} + C_2 t e^{-2t}$$
$$r = \pm 5i$$
$$y = C_1 \sin 5t + C_2 \cos 5t$$

$$r = -0.6 \pm 4.0i$$

$$y = e^{-0.6t} (C_1 \sin 4.0t + C_2 \cos 4.0t)$$

$$y = e^{-0.6t} C \sin(\omega t + \phi)$$