

eg

$$\frac{dy}{dx} + 2y = 0$$

$$4\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 7y = 0$$

} Homogeneous
ODEs.

If $f(x)$ is $\neq 0$, then the equation is non-homogeneous.

eg

$$\frac{dy}{dx} + 7y = e^x$$

non-homogeneous.

$$\frac{d^4y}{dx^4} + 3\frac{d^2y}{dx^2} + 5y = x \quad (\text{non homogeneous})$$

$$x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} = xy \quad (\text{homogeneous})$$

→ bcz no function is free of y .