

Homogeneous ODEs

Homogeneous function

Consider a function $f(x, y)$

$$\text{put } x = tx \quad \& \quad y = ty$$

$$f(tx, ty) = t^n f(x, y)$$

f is homogeneous of degree ' n '

Exp $f(x, y) = x^3 + x^2y + xy^2$

$$\text{put } x = xt \quad \& \quad y = yt$$

$$f(xt, yt) = (xt)^3 + (xt)^2(yt) + (xt)(yt)^2$$

$$= t^3 [x^3 + x^2y + xy^2]$$

↓
given function

$$\text{So } f(xt, yt) = t^3 f(x, y)$$

Homogeneous function of degree 3.