

Voorwaarde van Euler toepassen

1. Omvormen

$$x^2 + y^2 = - \left(2xy + xy^2 + \frac{x}{x^3} \right) y' \quad \text{met } y' = \frac{dy}{dx}$$

$$(x^2 + y^2) dx = - \left(2xy + xy^2 + \frac{x}{x^3} \right) dy$$

$$(x^2 + y^2) dx + \left(2xy + xy^2 + \frac{x}{x^3} \right) dy = 0$$

Voorwaarde controleren en vernieuwingsmet met $f(y)$

$$\frac{\partial}{\partial y} \left((x^2 + y^2) f(y) \right) = \frac{\partial}{\partial x} \left(\left(2xy + xy^2 + \frac{x}{x^3} \right) f(y) \right) \quad (*)$$

$$(*) : \quad = 2yf(y) + f'(y)(x^2 + y^2)$$

$$(*) : \quad = (2y + y^2 + x^2) f(y) = (2yf_2 + y^2f_2 + x^2f_2) = (2yf_2 + y^2f_2 + x^2f_2)$$

=> invullen in (*)

$$2yf_2x + (2yf_2 + y^2f_2 + x^2f_2) = 2yf_2(y) + y^2f_2(y) + x^2f_2(y)$$

$$\frac{dy}{dx} = f'(y) \quad \text{met } f'(y) = \frac{f(y)}{x^2 + y^2} \quad (*)$$

$$(*) \quad \int dy = \int \frac{f(y)}{x^2 + y^2} \quad (*)$$

$$x^2 + y^2 = C e^y \quad (*)$$