# Runge kutta nivel cuatro

$$Y_{k+1} = Y_k + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$$

$$k_1 = f(X_k, Y_k)h$$

$$k_2 = f\left(X_k + \frac{h}{2}, Y_k + \frac{h}{2}k_1\right)h$$

$$k_3 = f\left(X_k + \frac{h}{2}, Y_k + \frac{h}{2}k_2\right)h$$

$$k_4 = f(X_k + h, Y_k + hk_3)h$$

$X_0 = 0 \quad h = 0.2 \quad Y_0 = 1$

$$Y_1 = Y_0 + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4) \; ; \; f(x,y) = x + y - 1$$

$$k_1 = f(0,1)0.2$$

$$= (0 + 1 - 1)(0.2)$$

$\boxed{k_1 = 0}$

$$K_2 = f\left(X_0 + \frac{h}{2}, Y_0 + \frac{h}{2}k_1\right)h$$

$$= f\left(0 + \frac{0.2}{2}, 1 + \frac{0.2}{2}(0)\right)(0.2)$$

$$= f(0.1, 1)(0.2)$$

$$= (0.1 + 1 - 1)(0.2)$$

$\boxed{K_2 = 0.02}$