3- Sea la ecuacion diferencial de primer orden $y\prime = \frac{x-y}{1+(xy)^2}$ para

$1 \leq x \leq 2$ y $y(1) = 1$

Obtenga una sucesion de puntos que aproxime la solucion en el intervalo [1,2] usando euler h=0.2

$y' = \frac{x-y}{1+(xy)^2}$ para $1 \leq x \leq 2$ y $y(1) = 1$

$n =$

$h = \frac{2-1}{5} = 0.2$ Es la distancia entre los puntos.i es la posicion, multiplicar por el h

$$x_i = a + ih$$

$y' = \frac{x-y}{1+(xy)^2}$ para $1 \leq x \leq 2$ y $y(1) = 1$

$x_i = 1 + i(0.2)$

$f(x,y) = \frac{x-y}{1+(xy)^2}$

El primer yk, lo tenemos como dato y(0)(x)=1(y)

$y_{k+1} = y_k + hf(x_k, y_k)$

$y_{k+1} = 1 + 0.2(f(1,1)) = 1.0$

$y_{k+1} = 1 + 0.2(f(1.2,1)) = 1.0164$

$y_{k+1} = 1.0164 + 0.2(f(1.4, 1.0164)) = 1.0418$

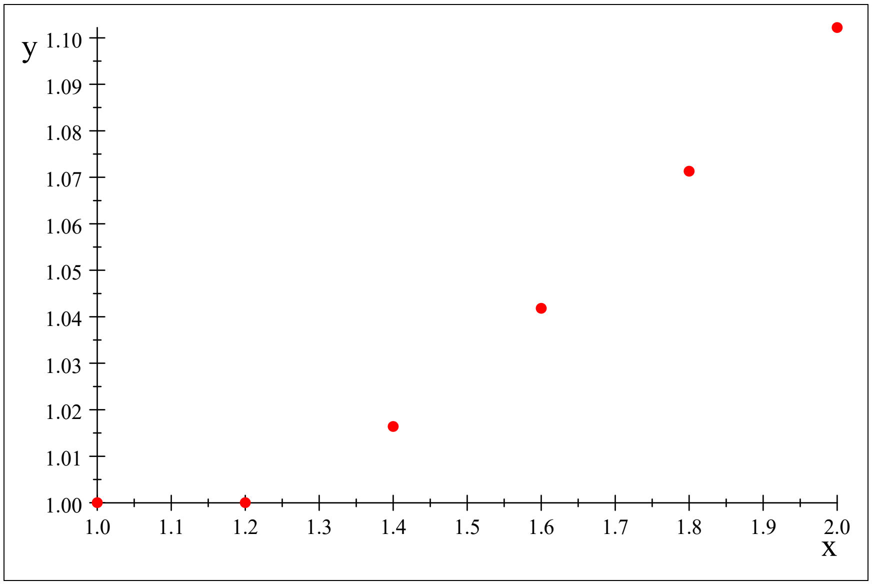
$y_{k+1} = 1.0418 + 0.2(f(1.6, 1.0418)) = 1.0713$

$y_{k+1} = 1.0713 + 0.2(f(1.8, 1.0713)) = 1.1022$

| $x_k$ | $y_k$ |
|---|---|
| 1 | 1 |
| 1.2 | 1.0 |
| 1.4 | 1.0164 |
| 1.6 | 1.0418 |
| 1.8 | 1.0713 |
| 2 | 1.1022 |

Entonces:

$S(x,y) = \{(1,1), (1.2, 1.0), (1.4, 1.0164), (1.6, 1.0418), (1.8, 1.0713), (2, 1.1022)\}$




Siempre respetar esas formulas...

$$u_{1,k} = hf(x_k, y_k)$$
$$u_{2,k} = hf(x_k + \tfrac{h}{2}, y_k + \tfrac{1}{2}u_{1,k})$$
$$u_{3,k} = hf(x_k + \tfrac{h}{2}, y_k + \tfrac{1}{2}u_{2,k})$$
$$u_{4,k} = hf(x_{k+1}, y_k + u_{3,k})$$
$$u_{1,1} = hf(1.2, 1) = 1.6393 \times 10^{-2}$$
$$u_{2,1} = hf(1.2 + \tfrac{h}{2}, 1 + \tfrac{1}{2}1.6393 \times 10^{-2}) = 2.1473 \times 10^{-2}$$
$$u_{3,1} = hf(1.2 + \tfrac{h}{2}, 1 + \tfrac{1}{2}2.1473 \times 10^{-2}) = 2.1219 \times 10^{-2}$$
$$u_{4,1} = hf(1.4, 1 + 2.1219 \times 10^{-2}) = 2.4887 \times 10^{-2}$$