Phoebe Narcisse

Improved Euler's

$y' = $ given $y_0(x_0) = y_0$ step size $h = $ given

$(x_0, y_0) =$

(k_1) slope $= f(x_0, y_0) = ($plug into equation$)$

line $=$ $y = y_0 + f(x_0, y_0)(x - x_0)$

simplify $(y = mx + b)$

$x_{n+1} = x_n + h$

$k_1 = f(x_n, y_n)$

~~k2~~ $z_{n+1} = y_n + h(k_1)$

$k_2 = f(x_{n+1}, z_{n+1})$

$y_{n+1} = y_n + h/2\,(k_1 + k_2)$

Euler's

II $y = y_0 + f(x_0, y_0)(x - x_0)$

plug in y_0, x_0 to find slope $(f(x_0, y_0))$

~~line: the~~ find the line

for other intervals do same but w/ x_n, y_n

Runge-Kutta

slope : $\dfrac{k_{1i} + 2k_{2i} + 2k_{3i} + k_{4i}}{6}$

slope 1 $k_{1,1} = f(x_0, y_0)$

2 $k_{2,1} = f(x_0 + \frac{h}{2}, y_0 + k_{1,1}\frac{h}{2})$

3 $k_{3,1} = f(x_0 + \frac{h}{2}, y_0 + k_{2,1}\frac{h}{2})$

4 $k_{4,1} = f(x_1, y_0 + k_{3,1} h)$