

Método de Runge – Kutta
2º ejemplo resuelto con detalles

$$y' = 2x + 3y \quad ; \quad y(1) = 1 \quad ; \quad h = 0.10$$

$$k_1 = hf(x_n, y_n)$$

$$k_2 = hf\left(x_n + \frac{h}{2}, y_n + \frac{k_1}{2}\right)$$

$$k_3 = hf\left(x_n + \frac{h}{2}, y_n + \frac{k_2}{2}\right)$$

$$k_4 = hf(x_n + h, y_n + k_3)$$

$$k_{prom} = \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$$

	$x_{n+1} = x_n + h$	$y_{n+1} = y_n + k_{prom}$	k_1	k_2	k_3	k_4	k_{prom}
0	$x_0 = 1.0000$	$y_0 = 1.0000$	$x_0 = 1.0000$ $y_0 = 1.0000$ $f = 5.0000$ $k_1 = 0.5000$	$x_0 + \frac{h}{2} = 1.0500$ $y_0 + \frac{k_1}{2} = 1.2500$ $f = 5.8500$ $k_2 = 0.5850$	$x_0 + \frac{h}{2} = 1.0500$ $y_0 + \frac{k_2}{2} = 1.2925$ $f = 5.735$ $k_3 = 0.5735$	$x_0 + h = 1.1000$ $y_0 + k_3 = 1.5735$ $f = 6.9205$ $k_4 = 0.69205$	$k_{prom} = 0.584841$
1	$x_1 = 1.1000$	$y_1 = 1.5848$	$x_1 = 1.1000$ $y_1 = 1.5848$ $f = 6.9544$ $k_1 = 0.69544$	$x_1 + \frac{h}{2} = 1.1500$ $y_1 + \frac{k_1}{2} = 1.93252$ $f = 8.09756$ $k_2 = 0.809756$	$x_1 + \frac{h}{2} = 1.1500$ $y_1 + \frac{k_2}{2} = 1.3911$ $f = 3.199716$ $k_3 = 0.319971$	$x_1 + h = 1.2000$ $y_1 + k_3 = 1.5537$ $f = 3.7288$ $k_4 = 0.37288$	$k_{prom} = 0.319024$
2	$x_2 = 1.2000$	$y_2 = 1.9038$	$x_2 = 1.2000$ $y_2 = 1.9038$ $f = 8.1114$ $k_1 = 0.81114$	$x_2 + \frac{h}{2} = 1.2500$ $y_2 + \frac{k_1}{2} = 2.30937$ $f = 9.42811$ $k_2 = 0.942811$	$x_2 + \frac{h}{2} = 1.2500$ $y_2 + \frac{k_2}{2} = 2.37521$ $f = 9.62563$ $k_3 = 0.962563$	$x_2 + h = 1.3000$ $y_2 + k_3 = 2.86636$ $f = 11.1991$ $k_4 = 1.11991$	$k_{prom} = 0.956966$
3	$x_3 = 1.3000$	$y_3 = 2.86077$					