**Runge-Kutta Third Order Method Version 1**

This method is a third order Runge-Kutta method for approximating the solution of the initial value problem *y'(x) = f(x,y)*;  *y(x0) = y0* which evaluates the integrand,*f(x,y)*, three times per step. For step *i+1*,

*yi+1 = yi + 1/6 ( k1 + 4 k2 + k3 )*,

where

*k1 = h f(xi, yi)*,

*k2 = h f(xi + h / 2, yi + k1 / 2 )*,

*k3 = h f(xi + h, yi - k1 + 2 k2 )*,

and *xi = x0 + i h*.  
  
This method is a third order procedure for which Richardson extrapolation can be used.