Euler's Method

$$y_{n+1} = y_n + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)$$

$$k_1 = h \cdot f(x_n, y_n)$$

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

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

$$k_4 = h \cdot f(x_n + h, y_n + k_3)$$

```
function [x, y] = rk4_method(x0, xn, y0, h, f)
x = x0:h:xn;
y(1) = y0;

for n = 1:length(x)-1
    k1 = h * f(x(n), y(n));
    k2 = h * f(x(n)+h/2, y(n)+k1/2);
    k3 = h * f(x(n)+h/2, y(n)+k2/2);
    k4 = h * f(x(n)+h, y(n)+k3);
    y(n+1) = y(n) + (1/6)*(k1+2*k2+2*k3+k4);
end

plot(x, y, '*-');
legend('f(x)');
title('Ruge Kutta''s Method');
end
```