



2. Метод Рунге-Кутты для системы уравнений

r = 1

$$\begin{aligned}y(x_{i+1}) &= y(x_i) + h * y'(x_i, y_i, z_i) + O(h^2) \\z(x_{i+1}) &= z(x_i) + h * z'(x_i, y_i, z_i) + O(h^2)\end{aligned}$$

r = 4

$$\begin{aligned}\Delta y_i &= y(x_{i+1}) - y(x_i) = \frac{1}{6}(k_{1y} + 2k_{2y} + 2k_{3y} + k_{4y}) \\ \Delta z_i &= z(x_{i+1}) - z(x_i) = \frac{1}{6}(k_{1z} + 2k_{2z} + 2k_{3z} + k_{4z})\end{aligned}$$

$$\begin{aligned}k_{1y} &= h * y'(x_i, y_i, z_i) \\ k_{1z} &= h * z'(x_i, y_i, z_i)\end{aligned}$$

$$\begin{aligned}k_{2y} &= h * y'(x_i + \frac{h}{2}, y_i + \frac{k_{1y}}{2}, z_i + \frac{k_{1z}}{2}) \\ k_{2z} &= h * z'(x_i + \frac{h}{2}, y_i + \frac{k_{1y}}{2}, z_i + \frac{k_{1z}}{2})\end{aligned}$$

$$\begin{aligned}k_{3y} &= h * y'(x_i + \frac{h}{2}, y_i + \frac{k_{2y}}{2}, z_i + \frac{k_{2z}}{2}) \\ k_{3z} &= h * z'(x_i + \frac{h}{2}, y_i + \frac{k_{2y}}{2}, z_i + \frac{k_{2z}}{2})\end{aligned}$$

$$\begin{aligned}k_{4y} &= h * y'(x_i + h, y_i + k_{3y}, z_i + k_{3z}) \\ k_{4z} &= h * z'(x_i + h, y_i + k_{3y}, z_i + k_{3z})\end{aligned}$$