



Four-steps Runge-Kutta method:

$$\begin{cases} X^{(k)} = X^{(k-1)} + \frac{\Delta t}{6}(K_1 + 2K_2 + 2K_3 + K_4) \\ K_1 = f(t^{(k-1)}, X^{(k-1)}) \\ K_2 = f(t^{(k-1)} + \frac{\Delta t}{2}, X^{(k-1)} + \frac{\Delta t}{2}K_1) \\ K_3 = f(t^{(k-1)} + \frac{\Delta t}{2}, X^{(k-1)} + \frac{\Delta t}{2}K_2) \\ K_4 = f(t^{(k-1)} + \Delta t, X^{(k-1)} + \Delta tK_3) \\ f(t, X) = \frac{dX}{dt} \end{cases}$$