$$Y' = \frac{dY}{dt} = F(t, Y)$$

$$Q_0 = 0$$

$$Y(t) = \begin{pmatrix} x(t) \\ y(t) \\ v_x(t) \\ v_y(t) \end{pmatrix}, \quad F(t, Y) = \begin{pmatrix} v_x(t) \\ v_y(t) \\ a_x(t) \\ a_y(t) \end{pmatrix}, \quad Y_0 = \begin{pmatrix} v_{x0} \\ v_{y0} \\ a_{x0} \\ a_{y0} \end{pmatrix}$$

$$K_1 = h \cdot F(x_0, Y_0), \qquad Y_1 = Y_0 + \frac{1}{2}(K_1 - 2Q_0);$$

$$Q_1 = Q_0 + \frac{3}{2}(K_1 - 2Q_0) - \frac{1}{2}K_1$$

$$K_2 = h \cdot F(x_0 + \frac{h}{2}, Y_1), \qquad Y_2 = Y_1 + (1 - \sqrt{1/2})(K_2 - 2Q_1);$$

$$Q_2 = Q_1 + 3(1 - \sqrt{1/2})(K_2 - Q_1) - (1 - \sqrt{1/2})K_2$$

$$K_3 = h \cdot F(x_0 + \frac{h}{2}, Y_2), \qquad Y_3 = Y_2 + (1 + \sqrt{1/2})(K_3 - Q_2);$$

$$Q_3 = Q_2 + 3(1 + \sqrt{1/2})(K_3 - Q_2) - (1 + \sqrt{1/2})K_3$$

$$K_4 = h \cdot F(x_0 + \frac{h}{2}, Y_3), \qquad Y_4 = Y_3 + \frac{1}{6}(K_4 - 2Q_3);$$

$$Q_4 = Q_3 + \frac{3}{6}(K_4 - 2Q_3) - \frac{1}{2}K_4$$

$$a_x(t) = \sum_{i=1}^{n} \frac{Gm_i}{R_1^3}(x - x_i)$$

$$F = \sum_{i=1}^{n} F_i$$