Given the coupled system

$$\begin{array}{rclcl} y_1' &=& f_1(x,\ y_1,\ y_2,\ y_3) & \text{subject to} & y_1(x_0) = y_{1,0} \\ y_2' &=& f_2(\qquad\qquad\quad) & \text{subject to} & y_2(x_0) = y_{2,0} \\ y_3' &=& f_3(\qquad\qquad\quad) & \text{subject to} & y_3(x_0) = y_{3,0} \end{array}$$

we first calculate

$$\begin{array}{rclcl} k_{1,1} &=& h \cdot f_1\,(\,x_j,\ y_{1,j},\ y_{2,j},\ y_{3,j}\,) & \text{where} & y_{1,j} = y_1(x_j) \\ k_{1,2} &=& h \cdot f_2\,(\qquad\qquad\qquad\qquad) & \text{where} & y_{2,j} = y_2(x_j) \\ k_{1,3} &=& h \cdot f_3\,(\qquad\qquad\qquad\qquad) & \text{where} & y_{3,j} = y_3(x_j) \end{array}$$

then calculate

$$\begin{array}{rcl} k_{2,1} &=& h \cdot f_1\left(x_j + \dfrac{h}{2},\ y_{1,j} + \dfrac{k_{1,1}}{2},\ y_{2,j} + \dfrac{k_{1,2}}{2},\ y_{3,j} + \dfrac{k_{1,3}}{2}\right) \\ k_{2,2} &=& h \cdot f_2\left(\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\right) \\ k_{2,3} &=& h \cdot f_3\left(\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\right) \end{array}$$

then

$$\begin{array}{rcl} k_{3,1} &=& h \cdot f_1\left(x_j + \dfrac{h}{2},\ y_{1,j} + \dfrac{k_{2,1}}{2},\ y_{2,j} + \dfrac{k_{2,2}}{2},\ y_{3,j} + \dfrac{k_{2,3}}{2}\right) \\ k_{3,2} &=& h \cdot f_2\left(\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\right) \\ k_{3,3} &=& h \cdot f_3\left(\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\right) \end{array}$$

then

$$\begin{array}{rcl} k_{4,1} &=& h \cdot f_1\,(\,x_j + h,\ y_{1,j} + k_{3,1},\ y_{2,j} + k_{3,2},\ y_{3,j} + k_{3,3}\,) \\ k_{4,2} &=& h \cdot f_2\,(\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad) \\ k_{4,3} &=& h \cdot f_3\,(\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad) \end{array}$$

and finally, we calculate

$$\begin{array}{rcl} y_{1,j+1} &=& y_{1,j} + \dfrac{1}{6} \cdot (k_{1,1} + 2k_{2,1} + 2k_{3,1} + k_{4,1}\,) \\ y_{2,j+1} &=& y_{2,j} + \dfrac{1}{6} \cdot (k_{1,2} + 2k_{2,2} + 2k_{3,2} + k_{4,2}\,) \\ y_{3,j+1} &=& y_{3,j} + \dfrac{1}{6} \cdot (k_{1,3} + 2k_{2,3} + 2k_{3,3} + k_{4,3}\,) \end{array}$$

to give us the new values for y_1, y_2 and y_3 corresponding to x_{i+1}.