4

$$y''(t) + \sin(y(t)) = 0, \quad y(0)=1, \quad y'(0)=0$$

$$y_1 = y, \quad y_2 = y' \longrightarrow y_2 = y', \quad y_1' = y_2$$

$$y_1'(t) = y_1, \quad y_2'(t) = -\sin(y(t))$$

$$y_1' = y_2$$

$$y_2'(t) = -\sin(y(t)) = f(y)$$

$$y_2'(t) = -\sin(y(t)) = f(y)$$

$$k_1 = f(u_0) = f(y(0)) = -\sin(u_0)$$

$$k_2 = f(u_0 + \tfrac{h}{2}k_1) = -\sin(u_0 - \tfrac{h}{2}\sin(u_0))$$

$$k_3 = f(u_0 + \tfrac{h}{2}k_2) = -\sin(u_0 - \tfrac{h}{2}\sin(u_0 - \tfrac{h}{2}\sin(u_0)))$$

$$k_4 = f(u_0 + hk_3) = -\sin(u_0 - h\sin(u_0 - \tfrac{h}{2}\sin(u_0 - \tfrac{h}{2}\sin(u_0))))$$