Midterm Examination
Administered: Monday, October 11, 2004

Consider the second-order nonlinear ordinary differential equation boundary value problem.

$$\frac{d^2 y}{dt^2} + \sin\left(\frac{d^2 y}{dt^2}\right) = \frac{dy}{dt} - y \qquad (1)$$

with the boundary conditions

$$y(t_o) = y_o \qquad \text{and} \qquad y(t_f) = y_f \qquad (2)$$

Provide a detailed step-by-step algorithm of how you numerically obtain an approximate solution to this problem. Write the equations for specific examples of algorithms, e.g. Newton-Raphson or Euler, where used. Indicate loops where necessary.