

1. Using $n = 10$ and $n = 30$, solve

$$y'' = \frac{3(y')^2 \sin x}{1 + y^4}$$

subject to $y(-2) = 1$ and $y(3) = -1$. Make sure that the iterative part of the procedure has converged. Improve the first set of 9 values by Richardson extrapolation.

2. Using the fourth-order Runge-Kutta technique and $h = 0.1$, solve

$$y' = \frac{\sin(y + t)}{y^2 + t^2}$$

subject to $y(0) = 1$ in the $t = [0, 2]$ interval. Plot the results.