Second Assignment

Due Tuesday, February 10, 2004

Prepare a clear Mathematica notebook, labelled with your name, the assignment number, and clear explanations of the computations you are doing. Hand in a printed copy, and also attach an electronic copy in an email to rbk@louisiana.edu.

1. Consider the initial value problem

\[ y'(t) + \sin \left( \frac{1}{1 - y(t)} \right) = 0, \quad y(0) = 0. \]

(a) Try solving the problem with \texttt{DSolve}.

(b) Try solving the problem with \texttt{NDSolve}, for \( t \) between 0 and 1, and with \texttt{AccuracyGoal} and \texttt{PrecisionGoal} set equal, and set to equal to 1, 2, 4, and \texttt{Automatic}.

(c) Plot the five solutions, both separately and on the same plot.

(d) Is that what you expected? Discuss what you have found.

2. Do the same steps as with Problem 1, except do it for the initial value problem:

\[ y'(t) + (y(t))^{\frac{1}{1-t}} = 0, \quad y(0) = 1. \]