

Math 350 — Computer Assignment 7, due April 28, 2011

Do EITHER Problems 1–5 OR Problem 6. For an extra credit opportunity you can do both options.

1. (a) Write a function

```
function [tvec,yvec] = ModifiedEuler(t0,y0,f,h,N)
% [tvec,yvec] = ModifiedEuler(t0,y0,f,h,N)
% Modified Euler's method
% Inputs
% t0,y0: initial condition (y0 can be d-vector)
% f:     name or function handle of the right-hand side function f:(t,y)->f(t,y)
% h:     stepsize
% N:     number of steps
% Outputs
% tvec:  vector of t values
% yvec:  vector (or matrix) of corresponding y values
```

that implements the modified Euler method, and test it with an analog `ModifiedEulerDemo.m` of `EulerDemo350.m`.

- (b) Add a few lines of code to your `ModifiedEulerDemo.m` that illustrate the convergence order of the modified Euler method.
2. Do Exercise 7.3 in NCM. If you verify the claim algebraically instead of experimentally, then please turn in the solution to this part on paper.
3. Do Exercise 7.4 in NCM.
4. Do Exercise 7.5 in NCM.
5. Do Exercise 7.19 in NCM.
6. Do Exercise 7.21 in NCM.