

Math 118 – Week 3 Assignments
Fall Term 2003
BUCKMIRE

Monday September 8 *Class 4:*

We will formalize the method for generating approximations of values of a solution to an initial value problem. We will also see how this recursive process can be set up on a sophisticated calculator.

Reading:

CiC, p 53-65, 69-73

Homework #3 (6 points):

Consider the IVP: $y' = 0.321t^2$ where $y(0) = 0.41$. (Note: The differential equation in this problem is written in terms of the independent variable t , not the dependent variable y , so be careful.)

- (a) Use Euler's method to estimate the value of $y(1)$ when $\Delta t = 1$, $\Delta t = 0.5$, and $\Delta t = 0.25$. (Use three tables to display your work.)
- (b) Now solve the IVP exactly (this requires only your previous knowledge of calculus) and compare the exact value of $y(1)$ to your approximations from Euler's method. Do the approximations overestimate or underestimate the exact value? How can you explain this?

Due: Class 5

Wednesday September 10 *Class 5:*

We will follow up on the lab by considering modifications to the standard SIR model to cover new scenarios.

Reading:

CiC, p. 1-9, 20-21

Homework #4 (4 points):

CiC, p. 22, #21, #23, #25

Due: Class 6

Thursday September 11 Lab #1: Euler's Method in Excel

We will again work with Euler's method, this time on Excel spreadsheets, to explore the SIR Model. The focus this week is on writing, and an extensive writing assignment on Euler's method will be given.

Friday September 12 *Class 6:*

We will discuss the concept of successive approximation and link it to the formal definition of the limit of a sequence.

Reading:

CiC, p. 76-83

Homework:

Quiz # 2: Euler's method for systems of ODEs

Due: Class 7