

AED Econ 802  
Applied Computational Economics  
Homework 1  
Due Friday, October 2, 2009

1. Using Matlab, plot on a single figure the function  $f(x) = 1 - e^{2x}$  on  $[-1, 1]$  together with its first- and second-order Taylor approximations about the point  $x = 0$ . Use a grid of 501 equally spaced nodes.
2. Using the Matlab standard normal pseudo-random number generator `randn`, simulate a hypothetical time series  $\{y_t\}$  governed by the structural relationship

$$y_t = 5 + 0.05t + \epsilon_t$$

for years  $t = 1960, 1961, \dots, 2009$ , assuming that the  $\epsilon_t$  are independently and identically normally distributed with mean 0 and standard deviation 0.2. Using only Matlab elementary matrix operations, regress the simulated observations of  $y_t$  on a constant and time, then plot the actual values of  $y$  and estimated trend line against time.

3. Consider the rational expectations commodity market model discussed on pages 11 and 19 of the Lecture Overheads, Part 1. Write a Matlab script that, for support prices between 0.8 and 1.2, will:
  - (a) plot on a single figure the expected market price and the expected farm price as functions of the support price;
  - (b) plot on a single figure the ex-ante variance of the market price and the ex-ante variance of the farm price as functions of the support price; and
  - (c) plot the expected government subsidy per planted acre as a function of the support price.