General Mathematics and Computational Science I

Exercise 18

November 20, 2007

1. Solve the difference equation

$$x_{n+1} = x_n + h\, x_n\,, \qquad x_0 = 1\,.$$

Then show that

$$\lim_{h\to 0} x_{t/h} = \mathrm{e}^t\,,$$

where the limit is taken such that t/h is always integer.

Hint: Recall that

$$\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = \mathrm{e}\,.$$

2. Reconsider the argument leading to the "cobweb theorem of economics" from class.

   (a) Describe the relative size of the coefficients m_d, m_s, b_d, and m_s that lead to a negative stable equilibrium price p^*.

   (b) Can you think of an economic context where a negative stable equilibrium price might occur?