**ECO 244: Applied Mathematics II**

**Final Exam Sample Questions**

1. Solve the following differential equations:
2. ;
3. ;
4. Consider Market A, which has the following demand and supply functions:

and

1. Assuming that the rate of change in price overtime is directly proportional to excess demand, find the time path .
2. What is the intertemporal equilibrium price?
3. What is the market equilibrium price?
4. Is the price model dynamically stable if ?
5. **You are working in the marketing department of a computer software company. Your marketing team determines that a maximum of 30,000 units of a new product can be sold in a year. You hypothesize that the rate of growth of sales is proportional to the difference between the maximum sales and the current sales .**

**Use the given information to form a differential equation. Solve for the time path , if initial sales was 2000 units.**

1. **Suppose the refugee population of a certain country is growing at the rate of 2% per year. is the initial size of the refugee population.**
2. **Construct a difference equation to portray the refugee population growth between two years.**
3. **Calculate the size of the population after 4 years, if**
4. **Consider the demand and supply functions of Market B:**

**Since Market B is an agricultural market, production is lagged by one time period, for which current period’s market supply are based on the preceding period’s prices.**

1. **Determine the market price time path function .**
2. **What is the intertemporal equilibrium price?**
3. **Use the price time path function derived in (a) to sketch a Cobweb diagram. Discuss whether the oscillation is explosive (divergent), damped (convergent) or uniform.**

**\*\*RED indicates very very important!**

1. (a) If the initial value, graphically illustrate the time path of .

(b) Circle the correct attribute in relation to the time path graph you constructed above:-

* Divergent / Convergent / Uniform (neither convergent or divergent)
* Oscillatory / Non-oscillatory
* Increasing at an increasing rate / Decreasing at a decreasing rate / Increasing at a decreasing rate / Decreasing at an increasing rate
* Dynamically Stable / Dynamically unstable

1. Graphically illustrate the time path of . Include a detailed explanation on the pattern of the time path.

Linear programming problems can be found in this link with solutions. Scroll down at the bottom of the webpage, and visit pages 1, 2 and 3.

<http://www.purplemath.com/modules/linprog.htm>