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ECON 405

Economic Growth and Development **26 April 2016**

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Midterm

(The Solow Model of Economic Growth)

1. (50 Points) Suppose the production function of an economy is characterized by $Y_t = K_t^{\alpha} \cdot L_t^{1-\alpha}$, where $L_t = e^{nt}$.

a. **(5 Points)** What is the intensive form of the production function?

b. **(15 Points)** Starting from the Fundamental Equation of Growth (FEG), find the steady-state level of k_t, given that $\delta > 0$, $n > 0$, and $I_t = s \cdot Y_t$.

c. **(10 Points)** Find consumption per worker at steady state, c_{ss}.

d. **(10 Points)** What is the "golden rule of capital accumulation" / "golden saving rate"?

e. **(10 Points)** Suppose $s = 0.24$, $\alpha = 0.25$, $\delta = 0.04$, and $n = 0.02$. Find numerical values of k_{ss}, y_{ss} and c_{ss}.

2. **(10 Points)** Suppose that the production function is characterized by $Y_t = A \cdot K_t^{1/3} \cdot L_t^{2/3}$, where $A = 3$ is a technology parameter.

a. **(5 Points)** Find MPP_K.

b. **(5 Points)** Find MPP_{L}.

3. **(20 Points)** Suppose that aggregate production function of an economy is characterized by $Y_t = (K_t^{0.5} + L_t^{0.5})^2$, where Y_t is output, K_t is capital, L_t is labor. Determine whether this production function satisfies Inada conditions.

4. **(30 Points)** Suppose that you are given a Solovian model in which the production function is characterized by $Y_t = K_t^{\alpha} \cdot (A_t \cdot L_t)^{1-\alpha}$, where $L_t = L_0 e^{nt}$ and $A_t = A_0 e^{xt}$. Discuss in detail how this framework is used in **testing** differences in standards of living (level of economic development) across countries and income convergence. In short, discuss empirical use of the Solovian growth framework.