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## **Economics 732: Monetary Economics II**

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Cornell University

### **Problem Set # 1**

## **1 Optimal growth**

Assume one-sector technology.

$$W = \int_0^T u(c(t), k(t)) e^{-\delta t} dt$$

for  $T \leq \infty$ . Make assumptions about  $u(\cdot)$ . Analyze Pontryagin's necessary conditions. Are they sufficient? Analyze steady states, turnpikes, global stability, and uniqueness. Interpret the economics!

## **2 Burden of the debt**

Use the Phelps-Shell one-sector model. Do every possible steady-state graph including consumption-per-head versus debt-per-head, and capital-per-head versus debt-per-head. Numerically plot these for different parameters. Fully analyze bifurcation(s) in this model. Discuss the economics.

## **3 Ramsey-Cass-Koopmans model**

Correct the mistake in the lecture about the regime of complete specialization to consumption. Show by construction that for some cases the optimal trajectory will switch from nonspecialization to specialization and back.