

# Problem Set

mail@kenjisato.jp

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## Diagram for the Ramsey Model

The dynamics of the endogenous variables  $(\hat{k}, \hat{c})$  of the Ramsey model is governed by the following system of differential equations.

$$\begin{aligned}\hat{k} &= f(\hat{k}) - \hat{c} - (\delta + g + n)\hat{k} \\ \frac{\hat{c}}{\hat{c}} &= \frac{f'(\hat{k}) - \delta - \rho - \theta g}{\theta}\end{aligned}$$

(1) Complete Figure 1: Draw curves that correspond to

$$\hat{k} = 0 \quad \text{and} \quad \hat{c} = 0.$$

The above system of differential equations determines the trajectory from a given  $(\hat{k}(0), \hat{c}(0))$ . In the Ramsey model, however,  $\hat{k}(0)$  is given but  $\hat{c}(0)$  is not. So, there are infinite possibilities regarding the choice of initial  $(\hat{k}(0), \hat{c}(0))$ , which lies somewhere on the dotted vertical line in Figure 2. To understand how to choose the right initial value, you must understand how the trajectory from an arbitrary initial value looks like.

(2) Complete Figure 2: Draw the loci,  $\hat{k} = 0$  and  $\hat{c} = 0$  again and then draw a sketch of trajectories departing from the four initial conditions depicted as black dots.

Answer sheet. Please write your name and id number.

(1)



Figure 1:  $(\hat{k}, \hat{c})$  plane

(2)

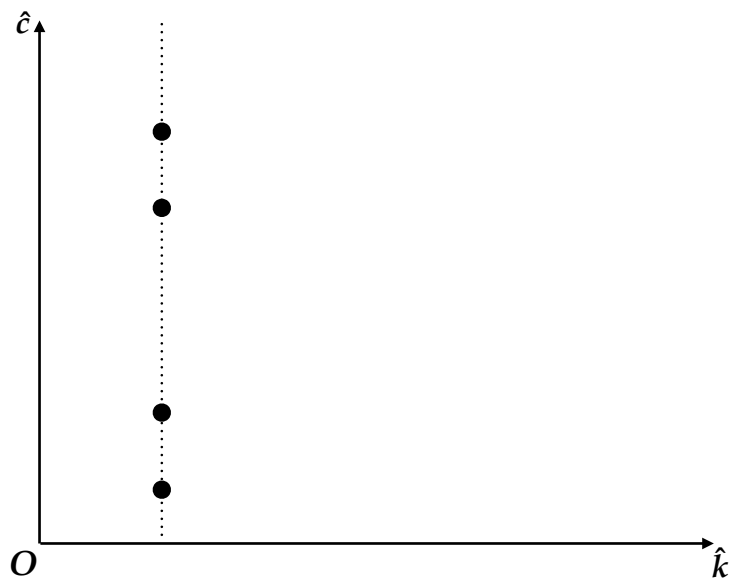


Figure 2: Draw trajectories from the dots