

Problem Set 1

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Note: I use bold symbols to denote vectors and nonbolded symbols to denote scalars. I primarily use vector notation to shorthand some of the sums, since many of the sums are dot products.

Problem 1

(1) The maximization FOCs give us:

$$\beta^t c_t^{-\theta} = \lambda_t$$

$$\lambda_t = \lambda_{t+1}(1 - \delta + \alpha A k_{t+1}^{\alpha-1})$$

$$\beta^t c_t^{-\theta} = \beta^t c_{t+1}^{-\theta}(1 - \delta + \alpha A k_{t+1}^{\alpha-1})$$

At steady state,

$$1 = (1 - \delta + \alpha A (k^*)^{\alpha-1})$$

$$\delta = \alpha A (k^*)^{\alpha-1}$$

$$\left(\frac{\delta}{\alpha A}\right)^{1/(\alpha-1)} = k^*$$

$$c^* = A (k^*)^\alpha - \delta k^*$$

$$c^* = A \left(\frac{\delta}{\alpha A}\right)^{\alpha/(\alpha-1)} - \delta \left(\frac{\delta}{\alpha A}\right)^{1/(\alpha-1)}$$

(2) See separate files.

(3) See figures.

(4)

Problem 2

Problem 3

(1)

(2)

(3)