

Economics 8185
Advanced Topics in Macroeconomics–Computation
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Homework 4.

1. Apply the finite element method to find the optimal consumption function $c(k)$ that solves the deterministic growth model:

$$\begin{aligned} \max \sum_{t=0}^{\infty} \beta^t \log(c_t) \\ \text{s.t. } c_t + k_{t+1} - (1 - \delta) k_t = A k_t^\theta. \end{aligned}$$

Use $\delta = 1$ as a test case.

2. Apply the finite difference method to find the optimal consumption function $c(k)$ that solves the deterministic growth model in continuous time:

$$\begin{aligned} \max \int_0^\infty e^{-\rho t} \log(c) dt \\ \text{s.t. } dk = (A k^\theta - \delta k) dt. \end{aligned}$$

As in (1), use $\delta = 1$ as a test case.

3. Compare the optimal policy functions to that of the nested case in Homework 1 with fixed technology ($z_t = \bar{z}$), inelastic labor ($\psi = 0$), and no growth ($\gamma_n = \gamma_z = 0$).
4. Compare time series of the three sets of results starting from $k_0 = 1/2k_{ss}$.