chapter 2

1. about compute the equilibrium and optimal path,

$$TV(x) \equiv \max_{y \in G(x)} \{U(x,y) + \beta V(y)\}. \tag{2.7}$$

(2.7) is what we compute in the programming, to iterate until TV=V, then we find the optimal path of K also the steady point, so by definition, by the nature of this bellman equation, "equilibrium" is a state, where K(t+1)=K(t), that is, where TV=

chapter 3

3.4 social planner problem

1. is it the logic: given a set of pareto weight $\bar{w}$, the planner has to allocate the consumption good, and maximize the aggregate utility, and later we see that if set the weight as the inverse of the individual household's maximization problem's Lagrange multiplier, then the allocation that planner finds is exactly the SCE allocation, but if we don't use this weight, then the social planner cannot reach SCE
2. the multiplier here μ^h is the marginal utility of household h, that is, in general, (including later in chapter 4), a multiplier is the value of relaxing the budget constraint for 1 unit, valuing with the current consumpition. Here in this optimazation problem, since the household use extra money to buy consumpiton, so the value here is marginal utility

chapter 4

1. about the household's first-order condition

$$\mu(t)(R(t)-\delta-n)=-\dot{\mu}(t)+(\delta-n)\mu(t) \tag{1}$$

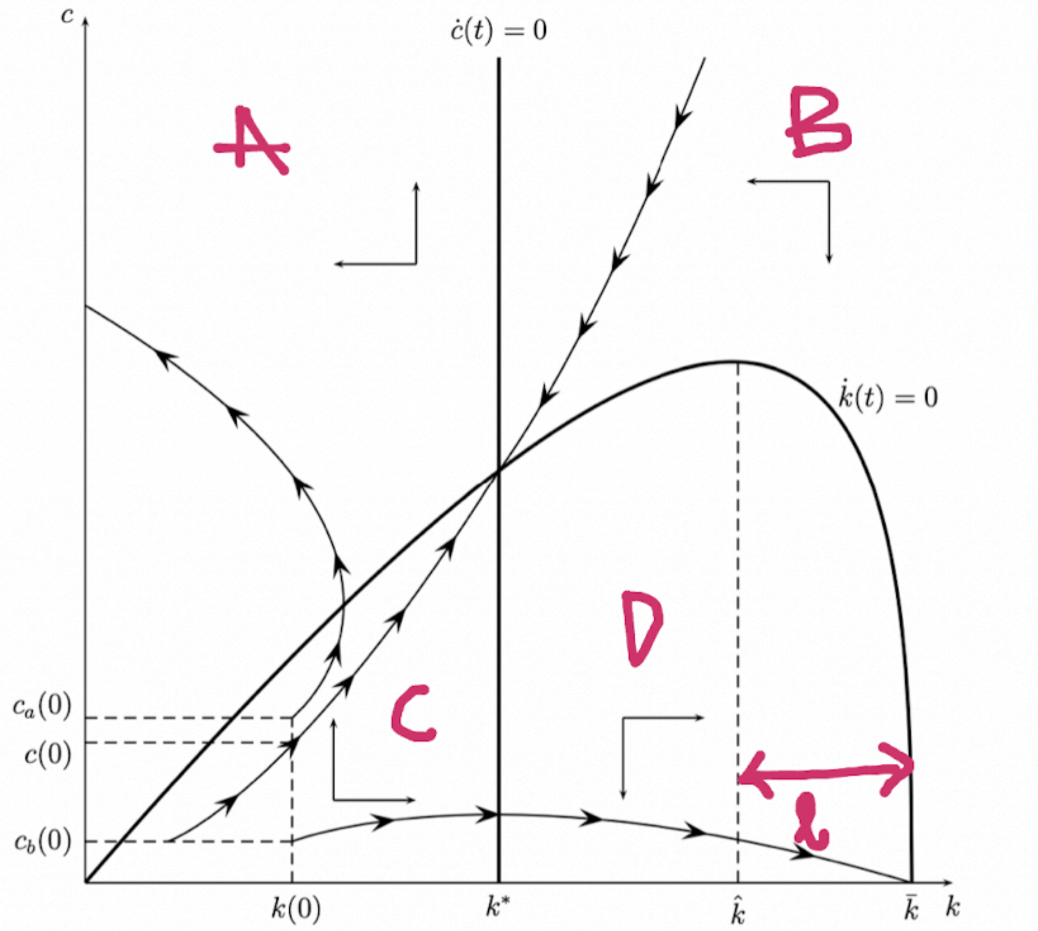
aboout the explanation of $\mu(t)$ and the LHS of this equation:

- $\mu(t)$ is the value of relaxing the budget constraint 4.24 by 1 unit
- LHS of (1) is the value of having 1 unit of extra asset

$$c(t)+\dot{a}(t)=(R(t)-\delta-n)a(t)+w(t)(4.24) \tag{2}$$

2. about the optimal path graph

Figure 4.1: Transitional dynamics in the baseline neoclassical growth model



$$\dot{k}(t)=f(k(t))-(n+\delta)k(t)-c(t). \tag{4.46}$$

$$\frac{\dot{c}(t)}{c(t)} = \frac{1}{\varepsilon_u(c(t))}(f'(k(t)) - \delta - \rho). \tag{4.47}$$

here 4.46 comes from two market clear condition (K and L), 4.47 combines optimazation of household and firm

- region A and C: k small, $f'(k)$ small, has incentive to postpone consumption, so consumption goes up
- Region A and B: consumption is too high, k decrease

3. About the little quiz in the class, when an economy experience an imigration shock, does it mean that it still has to be on the optimal path, just a lower (c,k) point, and it will still goes to the steady point, how does it affcect consumpiton and converge speed and k accumulation, my thought is, since we have to use extra k for these labor to work with, so current c decreases, and since more people work with capital to produce at the same time, it will converge to steady point faster (sorry i didn't catch this part in the lecture)
4.

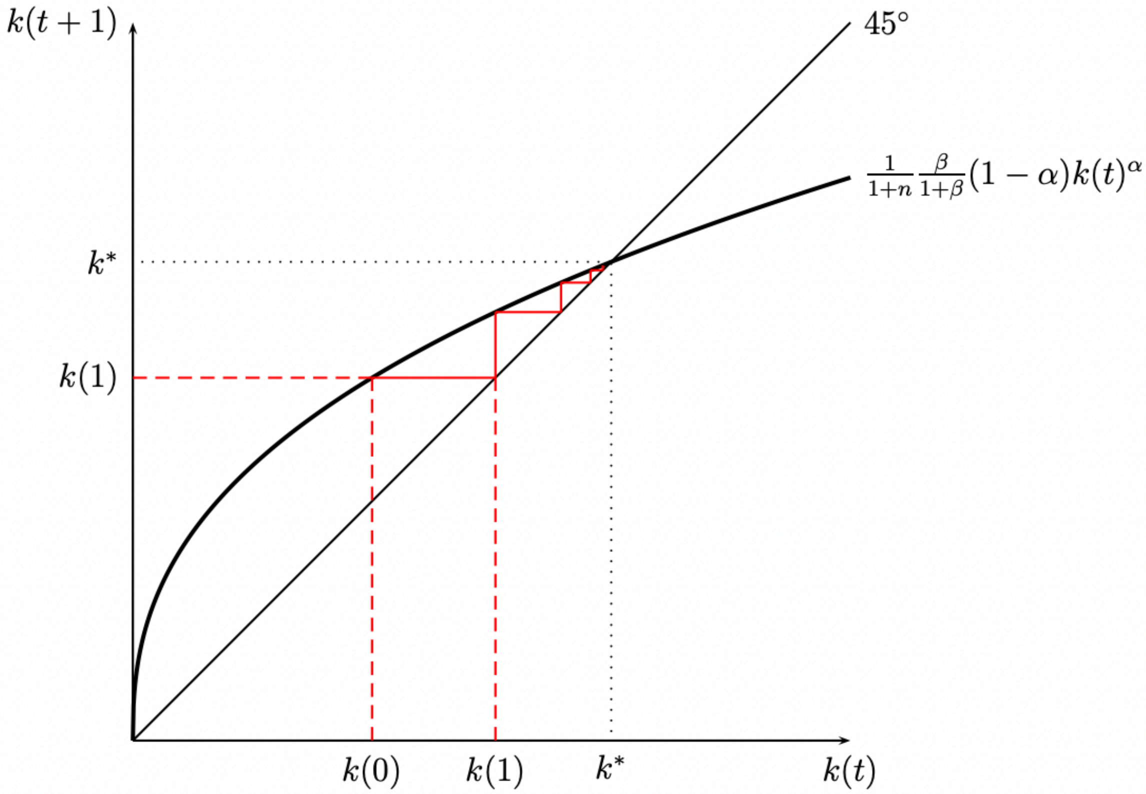
$$R(t) = f'(k(t)) \tag{4.22}$$
$$w(t) = f(k(t)) - f'(k(t))k(t). \tag{4.23}$$

The $f'(\cdot)$ in these two FOC , one is derivative wrt L, another is wrt K, but since we normalize labor to 1 and devided by L, the only entry of $f(\cdot)$ is k, so these two derivatives are the same, but what about there is no constant returns to scale? we cannot devide by L? should them be different then?

chapter 5

1. about the equilibrium

Figure 5.1: Equilibrium dynamics in the canonical overlapping generations model



we only have 1 equation for this :

$$k(t+1) = \frac{s(f(k(t)) - f'(k(t))k(t), f'(k(t+1)))}{1+n}. \tag{5.11}$$

we have 3 market, but this comes from only capital market clear condition, what about the other two conditions? where do they go in capturing the equilibrium?