

## Problem Set #2

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### 1. Checking Feasibility

- (a) For `bvec_guess = np.array([1., 1.2])`, my `feasible` function returns:  
feasibility of `[1, 1.2] = ([False, False], [False, False, True], False)`  
The consumption constraint is violated for period 3. if  $c_3$  is True,  $b_3$  should be true (my result should be wrong), i.e the first element of `b_cnstr` should be True.
- (b) For `bvec_guess = np.array([0.06, -0.001])`, my `feasible` function returns:  
feasibility of `[.06, -.001] ([False, False], [False, False, False], False)` Therefore, none of the constraints is violated
- (c) For `bvec_guess = np.array([0.1, 0.1])`, my `feasible` function returns:  
feasibility of `[.1, .1] ([False, False], [False, False, False], False)` Also, none of the constraints is violated

### 2. The steady state equilibrium

- (a) The function `get_SS` produces the following output:

```
ss_output = {'ss_time': 0.021498999999999935,  
'w_ss': 0.28081863036662547,  
'RCerr_ss': 0.026118965090537238,  
'K_ss': 1.8762604238514332e-79,  
'b_ss': array([ -1.87010025e-80,  2.06327045e-79]),  
'r_ss': 1.021810349094628,  
'Y_ss': 0.95046305662550179,  
'c_ss': array([ 0.38299967,  0.38299967,  0.15834476]),  
'EulErr_ss': array([ 2.19675752e-201,  2.65892416e-199])}
```

(The values of outputs are incorrect)

- (b) When  $\beta$  increases to 0.5, the `get_SS` function gave me:

```
{'EulErr_ss': array([ 2.19675752e-201,  2.65892416e-199]),  
'K_ss': 1.8762604238514332e-79,  
'RCerr_ss': 0.026118965090537238,  
'Y_ss': 0.95046305662550179,  
'b_ss': array([ -1.87010025e-80,  2.06327045e-79]),  
'c_ss': array([ 0.38299967,  0.38299967,  0.15834476]),  
'r_ss': 1.021810349094628,  
'ss_time': 0.011284999999999999,  
'w_ss': 0.28081863036662547}
```

The values of my output should be wrong. Intuitively, when *beta* goes up, the individuals is being more patiently, the total production increases. Such change would also increase capital K. Thus, the savings would increase and consumption would also increases as the result of increase in capital usage. Hence, interest rate should decreases and wage increases (marginal product of labour increases).

### 3. Solve the non-steady-state equilibrium using

Initial set up:  $T = 30$ ,  $\xi = 0.2$