Computational Methods: Task list 3

To be handed in by February 21, 2020

1) Solve the planner version of the RBC model by projection.

   - Approximate log TFP as an n-state Markov process, with levels $z_1, z_2, \ldots, z_n$. (You can start with $n = 3$).
   - Approximate the consumption function as a polynomial of capital, with a separate polynomial for each state of TFP. For example, in the case of a quadratic polynomial, you use
   $$c(k, z_i) = \gamma_{0,i} + \gamma_{1,i} k + \gamma_{2,i} k^2, \qquad i = 1, \ldots, n \tag{1}$$
   - Similarly, approximate the labor supply function as a polynomial of capital, with a separate polynomial for each state of TFP, such as
   $$L(k, z_i) = \kappa_{0,i} + \kappa_{1,i} k + \kappa_{2,i} k^2, \qquad i = 1, \ldots, n \tag{2}$$
   - Find the parameters γ and κ with the routine fsolve or with broydn (which is in the libm.tar.gz package). In the case of a quadratic, you have to find $3n$ parameters γ, and $3n$ parameters κ, so $6n$ parameters in total.
   - The residuals are the household Euler equation and the labor supply equation at each grid point. You need as many capital grid points as you have parameters in the polynomial. In the case of a quadratic approximation, you need 3 capital grid points. The grid points should be centered around the steady state.
   - You can initialize the parameters by the results from the Dynare solution of the RBC model.
   - Start by studying the program "growthnonlin.m" which is posted.