Econ 413R: Computational Economics

Spring Term 2013

Perturbation Methods for DSGE Models
Homework Set

Week 3

Homework 1

For the function $F(k', k) = (k^{.35} + .9k - k')^{-2.5} - .95(k'^{.35} + .9k')^{-2.5} = 0$, use perturbation methods to find the cubic approximation of $k' = f(k)$ about the point $k = 0.1$. In this case, $k' = f(0.1) = 0.069986$.

Homework 2a

For the Brock and Mirman model with the default parameter values find the scalar values of H_X, H_X, H_{XX}, H_{XZ}, H_{ZZ} and $H_{\sigma\sigma}$.

Plot the three-dimensional surface plot for the policy function $K' = H(K, z)$. Compare this with the closed form solution from the notes and the two approximations from the previous homework set (numbers 7a and 8a).

Homework 2b

Repeat the above exercise using $k \equiv \ln K$ in place of K as the endogenous state variable.

Lab 3a

Using Dynare replicate the results from the previous homework set, problem 14. Be sure to specify a first-order approximation. Report the linear coefficents in the policy function. Then replicate the moments and IRFs from problems 15 and 16.

Lab 3b

Repeat the above exercise using a second-order approximation of the policy function. Report all linear and quadratic coefficients. Comment on any differences.

Lab 3c

Repeat problem 3a using a third-order approximation of the policy function. Report all linear, quadratic and cubic coefficients. Comment on any differences.