Economics 613a: Computational Methods for Macroeconomics
Fall 2006
Assignment 4
Due: December 5th.

1. Let's go back to the deterministic growth model from question 2 of the first homework. Solve the model using the Galerkin projection method with Chebyshev polynomials as your basis functions. Compare your solutions for the policy functions to the ones you got when you solved the model by value function iteration.

2. Solve the basic deterministic growth model using the Galerkin projection method. Parameterize the consumption function and use piecewise linear polynomials as your basis functions. The model is

$$V(k) = \max_{k'} \; U(F(k) - k') + \beta V(k'),$$

where

$$U(c) = \frac{c^{1-\sigma} - 1}{1 - \sigma},$$

and

$$F(k) = zk^{\alpha} + (1 - \delta)k.$$

Set the parameters to $\alpha = 0.25$, $\sigma = 2.0$ $\delta = 0.05$, and $\beta = 0.99$. Set z such that steady state capital is equal to 1. Solve for the consumption function over the domain $[0, 2]$. Note that $c(0) = 0$. Use more elements close to $k = 0$ since the gradient is infinite there. See Chapter 6 of Marimon and Scott for more details.

3. Solve the stochastic growth model with the standard parameter values and functional forms (as we've been doing all along) by orthogonal collocation with Chebyshev basis functions. A good source for details is Judd (1992) in JET.