Activity 10

1) Discretize the x-axis into 5000 grid points and use matrix methods to solve the Schrodinger equation as an eigenvalue problem. Calculate the energy of the ground and first excited states for the potential, $V(x) = \frac{1}{2}\omega^2 x^4$, with $\omega = 0.0005$ (in atomic units).

2) Determine a reasonable interval for your x-domain over which to solve for $\Psi(x)$. For instance, doubling the x-domain should lead to only a minimal change in the calculated ground state energy (< 0.01%).

3) Plot the eigenfunctions of the grounds and first excited states.