1. Consider 1-dimensional system with a particle in an anharmonic potential

$$V(x) = \frac{1}{2}kx^2 + px^3,$$

where p is a small perturbation. The system is described by Schrödinger equation

$$-\frac{\hbar}{2m}\frac{d^2\psi(x)}{dx^2} + V(x)\psi(x) = E\psi(x),$$

Set $m = 1, \hbar = 1, k = 1$ and numerically solve the two lowest energy states for values of perturbation $p = 0.05$ and $p = 0.1$. Note, that eigenfunctions can be both even and odd, implying that not all solutions pass through zero. Compare your results to the non-perturbed case, $p = 0$. Also, find the corresponding wavefunctions and plot the two functions for a p of your choice along with the non-perturbed wave.