MECH105: Homework 10

When water vapor H_2O is heated to sufficiently high temperatures a significant portion of the water dissociates, or splits apart, to form oxygen (O_2) and hydrogen (H_2).

If it is assumed that this is the only reaction involved, the mole fraction x of H_2O that dissociates can be represented by

$$K = \frac{x}{1-x}\sqrt{\frac{2p_t}{2+x}}$$

where K is the reaction's equilibrium constant and p_t is the total pressure of the mixture.

If $p_t = 3atm$ and $K = 0.05$. determine the value of x that satisfies the equation.

Hints

- Use MATLAB. I do not tell you a specific function or method to use. Use whichever one is easiest!
- Remember to THINK, SKETCH, CODE, TEST, REPEAT!
- Make sure you understand what the question is asking for before you start!
- Show your work. What I mean by that is include your MATLAB script, any plots you make (a hint within a hint... HINTCEPTION!), and format it nice and pretty so the TA and I can follow along with your work. If you have questions on how to make it look pretty, ask the TA or Dr.B