AME 598T Homework 2 Due: Thursday, 3 February 2005, in class

Consider a problem of hydrogen dissociation and recombination:

$$H_2 + M \rightleftharpoons H + H + M.$$

- 1. Consider the approviate parameters for the reaction as found in the AIAA conference paper found in the documents section of the course home page. Take  $T = 6000 \ K$ . Write a code in Fortran and Mathematica to calculate the concentrations as a function of time if initial concentrations are  $[\hat{H}_2] = 0.001 \ mol/cm^3$ ,  $[\hat{H}] = 0.001 \ mol/cm^3$ . Give plots of concentration versus time and pressure versus time.
- 2. For the same initial conditions, generate a plot of how the equilibrium concentrations of H and  $H_2$  vary with temperature.
- 3. Give a plot of how the time scales found by linearization behave as temperature is varied over a wide range.
- 4. Using an appropriate text for guidance, give a derivation linking  $K^p$  to  $K^c$ .