AME 538
Homework 23
Due: Friday, 8 November 2002, in class

1. Given that a shock wave is propagating at $D = 600\ m/s$ into N_2 at rest with $T_1 = 130\ K$ and $P_1 = 2\ MPa$, and that the diatomic nitrogen is well modeled by a van der Waals thermal and caloric state equation

$$P = \frac{\rho RT}{1 - b\rho} - a\rho^2,$$

$$e = e_o + c_v(T - T_o) + a\left(\rho_o - \rho\right),$$

find appropriate values for the constants in a thermodyanics text, and solve the Rankine-Hugoniot shock jump equations to describe the shocked state, P_2, T_2, ρ_2, u_2.