AE 360
Homework 7
Due: Thursday, 6 March 1997, in class

The problems here are mainly from Fox and McDonald, *Introduction to Fluid Mechanics*, Fourth Edition, Wiley: New York, 1992. This is the main text for ME 334 this term. I will put a copy on reserve in the engineering library also.

1. Fox and McDonald, 13.28, p. 737.
2. Fox and McDonald, 13.38, p. 738.
3. Fox and McDonald, 13.53, p. 740.
4. Fox and McDonald, 13.83, p. 743.
5. Fox and McDonald, 13.173, p. 753.
6. Fox and McDonald, 13.181, p. 754.
7. Fox and McDonald, 13.186, p. 755.
8. Given $A(x) = 1.0\ m^2 + x(x - 1\ m)$, for $0\ m < x < 2\ m$, and entrance conditions at $x = 0\ m$ of $P_1 = 1.0\ MPa, T_1 = 300\ K$, and calorically perfect ideal air, with a Darcy friction factor of 0.004, plot $P(x)$ for five different values of back pressure: a) $P_b = (P_{subsonicdesign} + P_1)/2$, b) $P_b = P_{subsonicdesign}$, c) $P_b = (P_{subsonicdesign} + P_{supersonicdesign})/2$, d) $P_b = P_{supersonicdesign}$, and e) $P = P_{supersonicdesign}/2$. For this problem you may need to iterate to determine the inlet flow velocity, and for part c), the location of the shock.