AE 360
Homework 9
Due: Thursday, 27 March 1997, in class

1. Anderson, 4.1, p. 144.

2. Air at $T_o = 300\ K$, $P_o = 100\ kPa$, $M_o = 20$ encounters a wedge inclined at $10°$. Calculate the shock angle β and the post shock pressure assuming a calorically perfect ideal gas.

3. Repeat assuming an ideal gas with

$$e(T) = -19546\ \frac{J}{kg} + 731.33\ \frac{J}{kg\ K}\ T + 0.055648\ \frac{J}{kg\ K^2}\ T^2$$

   I recommend using mathematica for this problem. It may be possible to get an exact solution. It may be easier to iterate on β until you match the proper θ.

4. Repeat assuming a calorically perfect ideal gas and the linear theory valid for small wedge angle.

5. For calorically perfect ideal gases with very high incoming Mach number, a good estimate for wave angle and post shock pressure are

$$\beta = \frac{\gamma + 1}{2}\theta,$$

$$P_s = \frac{2\gamma \sin^2 \beta}{\gamma + 1} M_o^2 P_o.$$

   Repeat your estimates using this theory.