

AME 538

Homework 25

Due: Wednesday, 8 November 2000, in class

1. Air, considered to be calorically perfect and ideal, is at rest in a tube $P = 100 \text{ kPa}$ and $T = 300 \text{ K}$. A retractible piston rests at $x = 0$ for $-\infty < t < 0$. For $t \geq 0$, the piston is given the motion, $u_p = -U(1 - \exp(-t/\tau))$, $x_p(t = 0) = 0$, where $U = 500 \text{ m/s}$, and $\tau = 0.003 \text{ s}$. Find the pressure, velocity, and density at $x = 0.4 \text{ m}$, $t = 0.002 \text{ s}$.