Plasma Dynamic HW#3
Due 2/8/00

1. Find the averaged kinetic energy flux in the fluid moment expansion in terms of the following physical quantities:

$$\vec{\vec{p}} = \rho_m \langle \vec{w}\vec{w} \rangle$$

$$\vec{q} = \rho_m \frac{\langle \vec{w} w^2 \rangle}{2}$$

Where p is the pressure tensor and q is the heat flux vector.

2. Consider a non-isotropic Maxwellian plasma with an uniform magnetic field in the z direction. The plasma temperature are different in the parallel and normal directions

$$f(w) = n_o\left(\frac{m}{2\pi k_B T}\right)\left(\frac{m}{2\pi k_B T_{\|}}\right)^{1/2} \exp\left(-\frac{m}{2k_B}\left[\left(\frac{w_x^2 + w_y^2}{T}\right) + \frac{w_z^2}{T_{\|}}\right]\right)$$

Fin the Pressure tensor for this distribution.

3. Find the moments expansion for the thermal energy density of a magnetized plasma with no static electric field. Or

$$A(w) = \frac{1}{2}\rho_m w^2$$

4. From the first law of thermodynamics, find the adiabatic equation of state of a ideal gas.