APPH 6101 Plasma Physics I
Homework 5: Due 13 October, 2005.

Questions 1-4

Due problems 4.14, 4.17, 4.18, and 4.19 in Gurnett and Bhattacharjee, p. 134-135. (In problem 4.18, the force per unit length at a point x along a string is $T d^2y/dx^2$, where $y(x,\ t)$ is the displacement of the string.)

Question 5

Don Gurnett was part of the *Voyager I* scientific team that encounter the Jovian magnetosphere in 1980. In the figure below are measurements of whistler waves indicating lighting on the Jovian surface. Note that *Voyager* was near the equator at a radius of about $5.8\,R_J$. If the magnetic field of Jupiter is given by an ideal magnetic dipole, with an equatorial field strength that varies as $B(r) = 0.4(R_j/r)^3$ mT, what information can you learn from the spectrogram about the plasma density in Jupiter's magnetosphere? Keep your answers approximate.
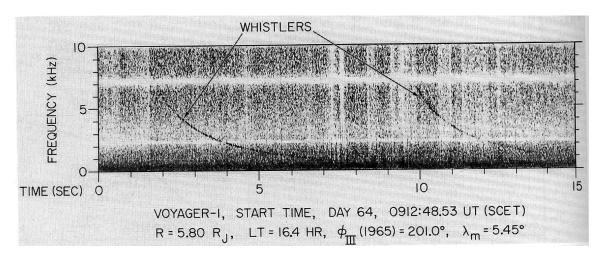

Figure 1: Measurement of whistler waves in Jupiter's magnetosphere.