Lecture 02 2009 09 14 MON

TOPICS: Conservation laws and pde.
   Integral and differential forms.
   Closure strategies. Quasi-equilibrium.

Derivation of pde by conservation laws. Integral and differential forms.
--- The pde given by a conserved density and the corresponding flux in 1-D and in multi-D.
--- Systems of conservation laws.
The problem of closure.
Example: Euler equations of gas dynamics (1-D) and closure via equilibrium thermodynamics.

Adding sources.

General closure strategy; quasi-equilibrium. Equations of state.
Examples: traffic flow and river flow.
--- Examine the properties of the flow equations of state for these two cases.
Equations of type $\rho t + c(\rho)\rho_x = 0$.
c has dimensions of velocity ... what is it? It is NOT the flow velocity,
which is defined by $q = \text{flow rate} = u\rho$, where $\rho = \text{conserved density}$. 