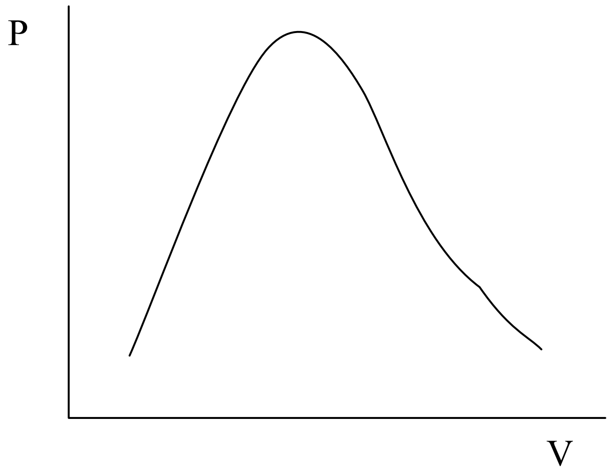
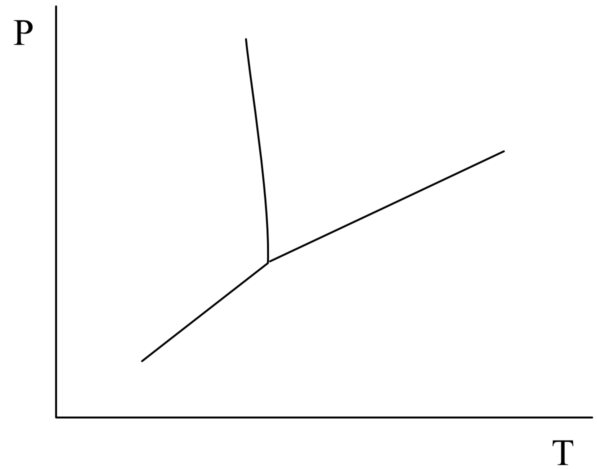
Recitation | **10.213** Spring 2002 | **03/11/02** YT

Steam Tables

Appendix F of the textbook are thermodynamics data for steam.
Table F.1. is for saturated steam. Table F.2. is for superheated steam. (F.3. and F.4. are in English units).
Label where these tables apply on the following diagrams:





Using the steam tables,
a) determine the pressure for saturated steam at 140°C.

b) determine ΔH for taking steam from 400°C, 1100 kPa to 500°C, 2200 kPa. (Note: what are the units?)

c) determine ΔG for problem b).

d) at P = 1 atm, determine H for saturated steam having quality x = 0.6.

Residual Properties

M = some molar thermodynamic property. We are looking at a single component system that goes from T_1,P_1 to T_2,P_2.

Then ΔM = +

ideal part deviation from ideal = (T , P) – (T ,P)

We know how to calculate the ideal properties, e.g. V^{ig} = ______________ and ΔH^{ig} = _________________

Ways to calculate the residual properties (M^R) :

1) Formulae, such as eqns (6.47) and (6.48). Since the equation involves Z, P, V, and T, we need information from _____________________of _____________. See section 6.3.
2) Since generalized correlation also gives information of Z, P, V, T, we can also use generalized correlation. Fortunately, somebody else did the dirty work and the results are in ________________________________.

Example Problem

Upon embarking on steam calculations one day, you find that your arch-nemesis has ripped apart Appendix F (steam tables) of your textbook. Determine ΔH for taking steam from 400°C, 1100 kPa to 500°C, 2200 kPa.

Bottom line:

We can *estimate* thermodynamic properties of any substance, if we know just a few pieces of information. For example to calculate ΔH for compression of a real gas, we need to know the following experimental data: