1 Derivatives from Data (NIST)

Use the NIST web site "Thermophysical Properties of Fluid Systems" to answer the following questions. This site is an excellent resource for finding experimentally measured properties of fluids.

(a) Find the partial derivatives

$$\left(\frac{\partial S}{\partial T}\right)_p$$

$$\left(\frac{\partial S}{\partial T}\right)_V$$

where p is the pressure, V is the volume, S is the entropy, and T is the temperature. Please find these derivatives for one gram of methanol at one atmosphere of pressure and at room temperature. Please note, you will encounter a problem if your step in T is too small, and you will encounter a different problem if your step in T is too big.

(b) Why does it take only two variables to define the state?

(c) Why are the derivatives above different?

(d) What do the words isobaric, isothermal, and isochoric mean?