

Problem 100C

Use the library to:

- Find the relation which governs the slope, $\partial p/\partial T$, of the saturated vapor/liquid line in the phase diagram for a simple fluid. What is the name of this classical result?
- Sometimes it is possible for a pure liquid to exist in a “metastable” state even at pressure, p , and temperature, T , values where the phase diagram tells us it should be vapor. Under such circumstances, the distance of this (p, T) state from the saturated vapor/liquid line along a line of constant pressure is called the “superheat” and denoted by ΔT (in degrees Kelvin). Alternatively the distance of the (p, T) state from the saturated vapor/liquid line along a line of constant temperature is called the “liquid tension” and is denoted by ΔP (in units of pressure). For a state (p, T) close to the saturated vapor/liquid line use the answer to the last question to estimate the relation between ΔT and ΔP .
- In water at 100°C , what tension, ΔP , corresponds to a superheat of 5°C ?