4.4 p, V, T surface for pure substance

Fig. 4.2 shows a typical example of a 3D phase diagram of a pure substance.

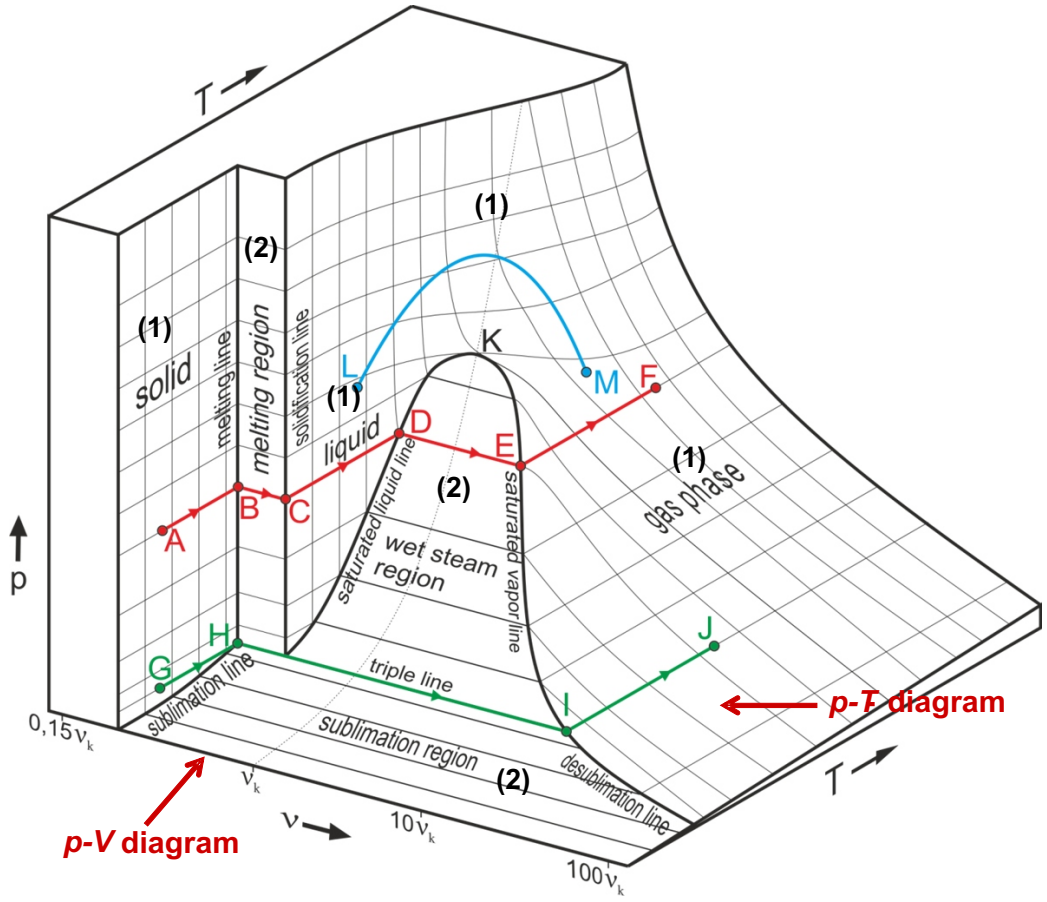

Figure 4.2: 3D representation of several planes and paths through a p, V, T diagram.

- The projection from the front represents the 2D $p-V$ diagram. The projection from the right side represents the 2D $p-T$ diagram.
- Areas marked with (1) are regimes with one phase; areas marked with (2) are regimes with two phases.
- The line from A to F represents a path with constant pressure, i.e. an isobaric (e.g. open container) heating experiment of a non-anomalous substance. The substance cannot be water since in this case one would expect a decrease in volume when melting occurs (anomaly of water based on its expanded solid structure).
- A→B: pure solid, small increase of V.
- B→C: solid + liquid, strong increase of V, isothermal due to latent heat.
- C→D: pure liquid, small increase of V.
- D→E: liquid + gas, strong increase of V, isothermal due to latent heat.
- E→F: pure gas, moderate increase of V.
- Triple line: coexistence of three phases.
- L→M: no phase segregation due to supercritical fluid (SCF).