Solutions to problems 5 and 6 of Tutorial 1

5) The Gibbs Duhem Equation relates changes in the chemical potential of a mixture’s components to the composition as: .

For a small macroscopic change:

Note that as this is a 2-componen binary system, the sum of the water and ethanol mole fractions need to equal 1, *n*water+*n*ethanol=1.

6) At the triple point, *T*3, the vapour pressure of the liquid and solid are equal, i.e. , from which we calculate *T*3=196.0 K.

We can plug in *T*3 in either of the expressions provided (I’m going to be using the 1st one but it shouldn’t matter) to get , so *p*3=11.1 Torr.