Raoult’s Law indicates the relation of the gas phase and liquid phase in the vapor liquid equilibrium. However, to achieve this law some assumptions are made such as assuming the mixture of the gas phase is an ideal mixture, the mixture of the liquid phase is also an ideal mixture. Pressure is low, and vapor of saturated liquid is an ideal gas.

So the initial form of this equation , simplifies to

. However, one of the assumptions is problematic compared to others. Although assuming a gas phase is an ideal gas is not very accurate, the molecular interactions are very low compared to other phases and this assumption can be done for simplicity purposes, but this is not the case for liquid phase, so the correction factor should not be eliminated which is , and called as activity coefficient.

The modified form of the Raoult’s Law for this analyse is expressed as

For this exercise only two activation coefficient models are implemented for ethanol water mixture which are one constant (two-suffix) Margules Model, and Van Laar Model.