

HW 9 – Underwood Equation(s)

A distillation column is separating toluene and xylene, $\alpha = 3.03$. Feed is a saturated liquid and reflux is returned as a saturated liquid. $P = 1.0$ atm. $F = 100$ kg mole/h. Distillate mole fraction is $X_D = 0.996$ and bottoms $X_B = 0.008$. Use the Underwood equation to find $(L/D)_{\min}$ and V_{\min} at feed concentrations of $z = 0.1, 0.3, 0.5, 0.7$ and 0.9 . Check your result with a McCabe-Thiele diagram. What are the trends for $Q_{C_{\min}}$ and $Q_{R_{\min}}$ as toluene feed concentration increases?