CM2120 Fundamentals of Chemical Engineering 2
Department of Chemical Engineering
Michigan Technological University

Homework 4
Due 25 February 2009

1. **Equilibrium Data for n-heptane / n-octane (10 points)**
Use Unisym to develop separate flash simulations with a fixed feed of n-heptane concentrations of 10, 20, 30, 40, 50, 60, 70, 80, and 90 mol%. Estimate the temperature of the saturated liquid and the n-heptane mole fraction in the vapor. Use this to generate an x-y plot and a T-x-y plot for this system.

2. **Mass Fraction (10 points).**
Create a new x-y plot from your mole fraction data in problem 1 in terms of mass fraction.

3. **Constant Molal Overflow? (10 points)**
Is it appropriate to use the constant molal overflow approximation for n-heptane / n-octane? What about the constant mass overflow approximation? Justify your answers.

4. **McCabe-Thiele Method (20 points)**
Using the equilibrium data in problem 1 above, develop the McCabe-Thiele method for this system. The feed is 50 mol% n-heptane (saturated liquid), the distillate is 90 mol% n-heptane, and the bottoms is 5 mol% n-heptane. The external reflux ratio is 8 (saturated liquid). Assume constant molal overflow.

5. **McCabe-Thiele Method (20 points)**
Repeat problem 4 assuming constant mass overflow.