and the recovery of n-heptane if all separators are at 1.013 bar and $V/L = 3$ in all separators. Txy data are given below:

x_1	y_1	T (C)	x_1	y_1	T (C)
0.00	0	173.63	0.55	0.9206	116.53
0.05	0.25146	164.52	0.60	0.93525	113.84
0.10	0.42826	156.67	0.65	0.94825	111.37
0.15	0.55558	149.84	0.70	0.9593	109.08
0.20	0.6497	143.89	0.75	0.96874	106.93
0.25	0.72101	138.65	0.80	0.97689	104.93
0.30	0.77493	133.94	0.85	0.98395	103.04
0.35	0.81765	129.75	0.90	0.99011	101.26
0.40	0.85169	125.97	0.95	0.99551	99.58
0.45	0.87922	122.54	1.00	1.00028	97.99
0.50	0.90181	119.4			

Problem 8.7: A mixture of normal heptane (40% by mol) in normal decane is to be separated in two flash separators. The feed stream is led to separator 1; the vapor stream of separator 1 is fed to separator 2 while the liquid stream from separator 2 is recycled into separator 1. Both separators operate at 1 atm. Heat exchangers are used to ensure that all streams that enter a separator are at the same temperature as the separator. Determine if the problem is fully specified and if not, make any additional specifications and solve the material balances. Report the purity of heptane and decane in the product streams and the % recovery of each component. Additional data: Use the fitted equations for x and y as functions of T that are given in Example 8.5.

Problem 8.8: Two flash separators in series operate at 1 atmosphere total pressure. The feed (F_1) into the first drum is a binary mixture of methanol/water that is 55 mol % methanol with flow rate 10,000 kg moles/h. The second flash drum operates at temperature, T_2 and the liquid product composition (x_2) is 15 mol % methanol.

a) What is the fraction vaporized in the first flash drum and the total fraction of the initial feed vaporized?

b) What are y_1, y_2, x_1, and T_2?

In this problem, the subscripts 1 and 2 refer to separator 1 and 2.

Additional information: The bubble and dew temperature (in °C) as a function of the mol fraction of methanol (x) are given by the following equations:

$$T_{\text{bubble}} = 143.77x^4 - 356.52x^3 + 317.44x^2 - 138.94x + 99.037$$

$$T_{\text{dew}} = 36.74x^4 - 65.732x^3 + 24.357x^2 - 30.966x + 100.06$$

add this sentence

The first flash drum operates at 75°C and its liquid stream is fed into the second drum.