

KC32603 Process Simulation and Integration

In-Class Exercise 5 (CLO1 – PLO2; WP1, WP4; WK3, WK4, WK5 WK6)

Add a Material Stream with the following data:

on this page...	Select...
Name	Feed
Temperature	25°C
Pressure	1 atm
Flowrate	1000 kgmole/h
Component	Mole Fraction
n-C ₄	0.30
n-C ₉	0.20
n-C ₁₁	0.15
n-C ₁₃	0.35

1. Simulate the Feed. What is the phase of this feed?
2. Briefly explain how to change the phase into a vapour phase? What is the boiling point of this feed?
3. Briefly explain what is a direct sequence? Draw the direct sequence for this Feed by showing corresponding component at all product streams.
4. Briefly explain what is an indirect sequence? Draw the indirect sequence for this Feed by showing corresponding component at all product streams.
5. Simulate the direct sequence in (3) using Short-Cut Distillation Column with product purities of 95 % and 99 %. What is the total energy required for both product purities? Justify the differences?
6. Simulate the indirect sequence in (4) using Short-Cut Distillation Column with product purities of 95 % and 99 %. What is the total energy required for both product purities?
7. Draw driving force curves for this Feed. Synthesis and draw a new sequence based on the driving force curves by showing corresponding component at all product streams.
8. Simulate the new sequence in (7) using Short-Cut Distillation Column with product purities of 95 % and 99 %. What is the total energy required for both product purities?
9. By comparing total energy requirements for simulations in (5), (6) and (8) for product purities of 99 %, identify which sequence has the lowest energy requirement?