CHE381 LAB -6

Distillation Column: Steady State & Dynamics

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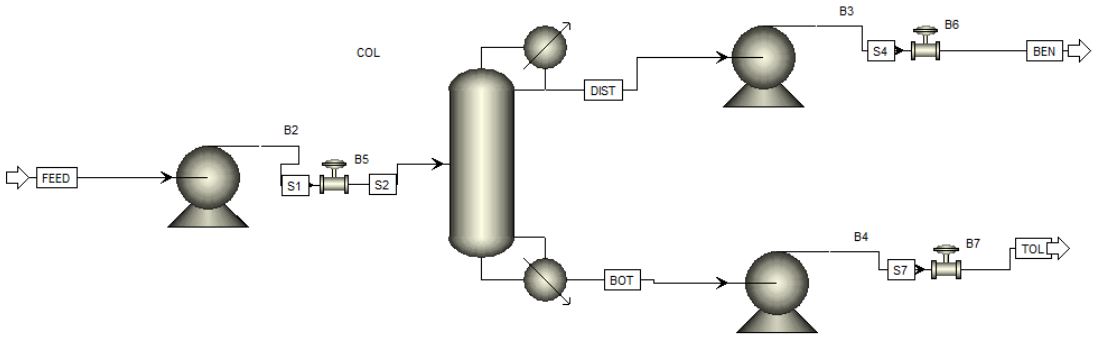
Aim - to recover 99.5% of benzene at top.

Base method – PENG-ROB. **Equipments used** : RadFrac Column , Pumps ,Valves.

1)



Diameter of column = 1.019124658 m , also L=2D and time =10 min

On calculating we get

Diameter of reflux drum = =1.058 m and length =2.116 m

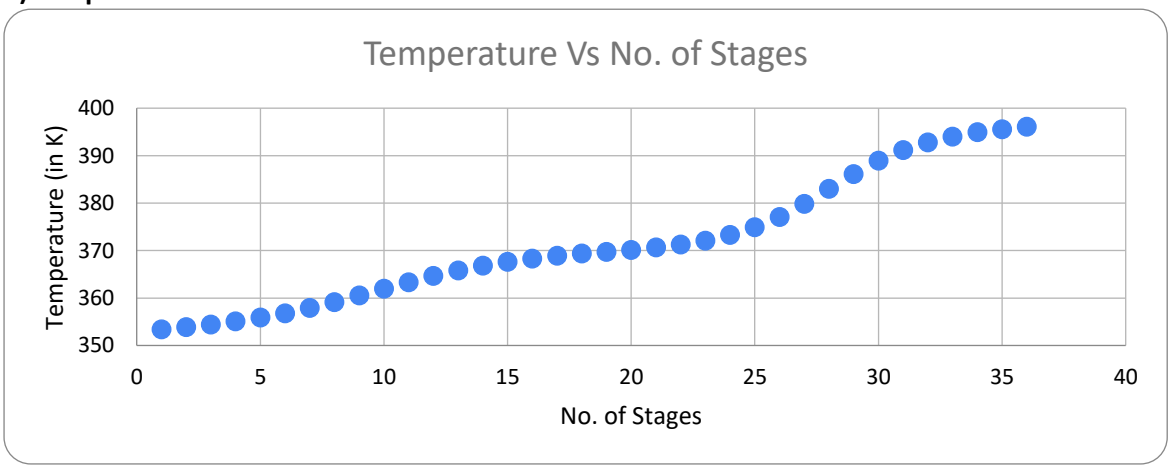
for sump diameter = 1.348 m and length = 2.696 m

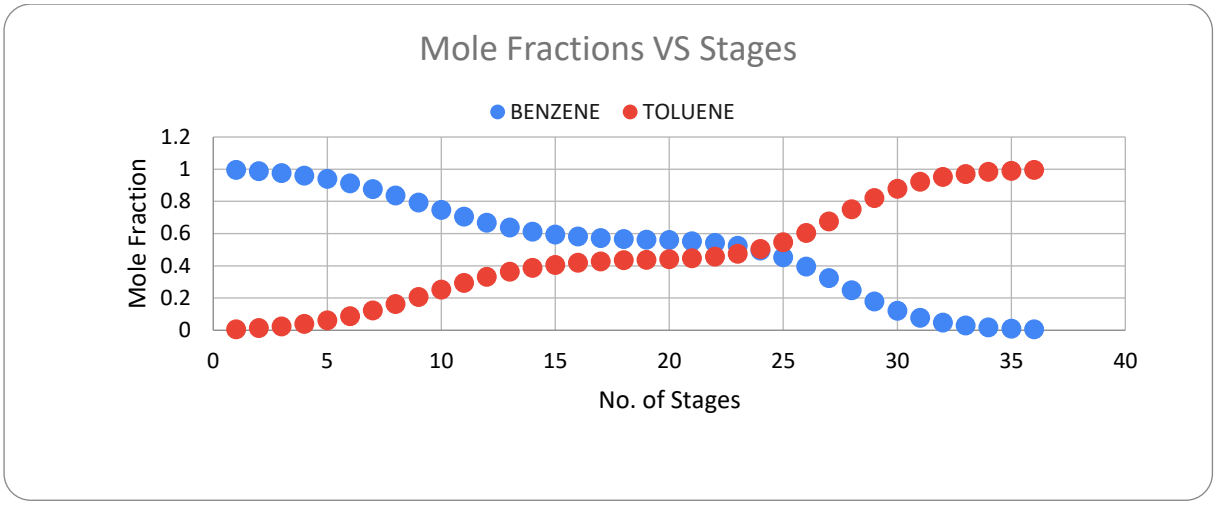
Column Diameter (m)	1.019124658
Total Trays (Nt)	36
Feed stage	18
Sensitivity tray	28

flow rates : **mole fractions :**

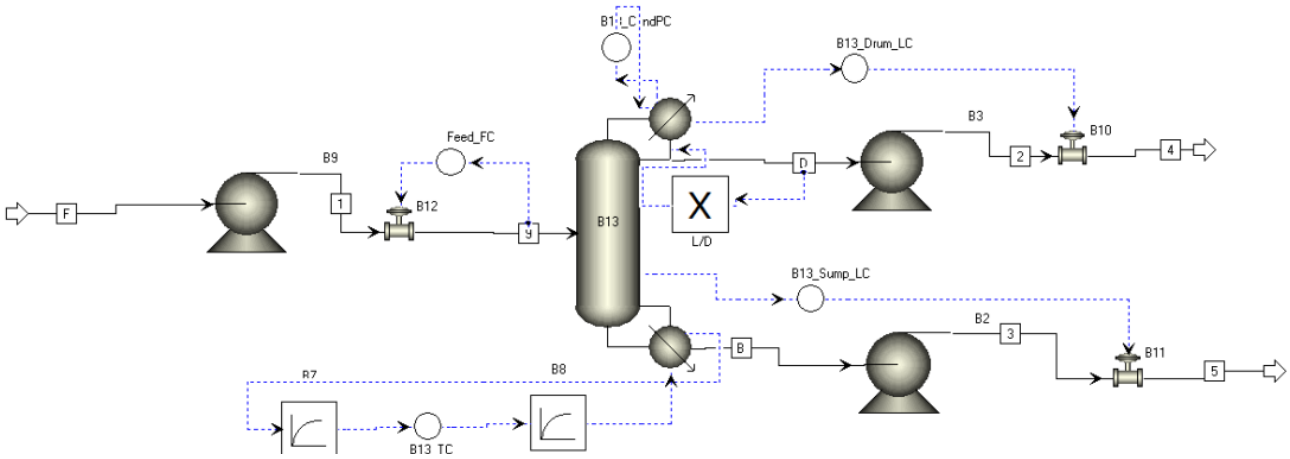
Material	Feed(kmol/hr)	Dist(kmol/hr)	Bot(kmol/hr)	Material	Feed	Dist	Bot
Benzene	50	49.75	0.25	Benzene	0.5	0.995	0.05
toluene	50	0.25	49.75	toluene	0.5	0.05	0.995

2) Graphs :





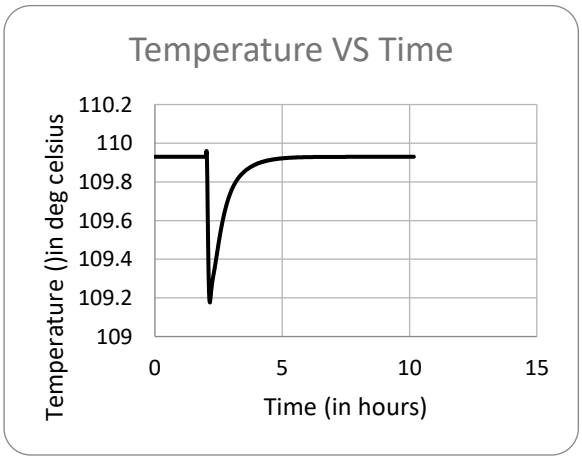
3) Column diagram with controller :

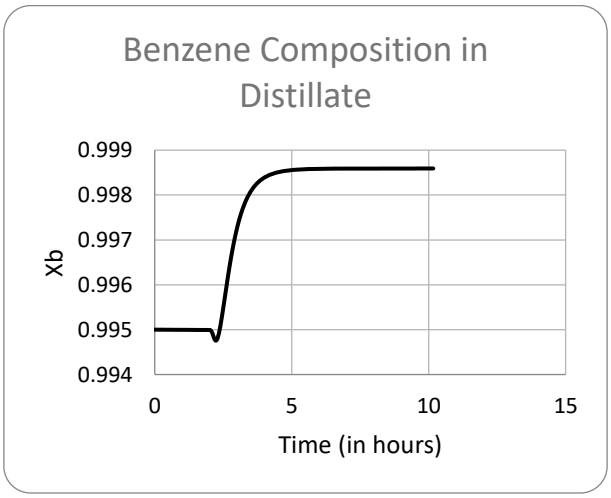


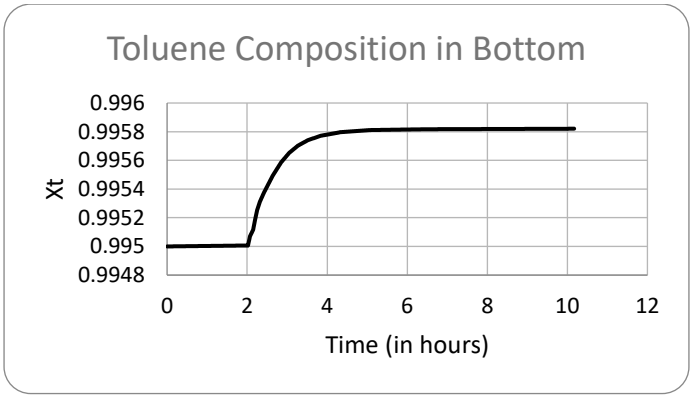
4) Tuning Parameters :

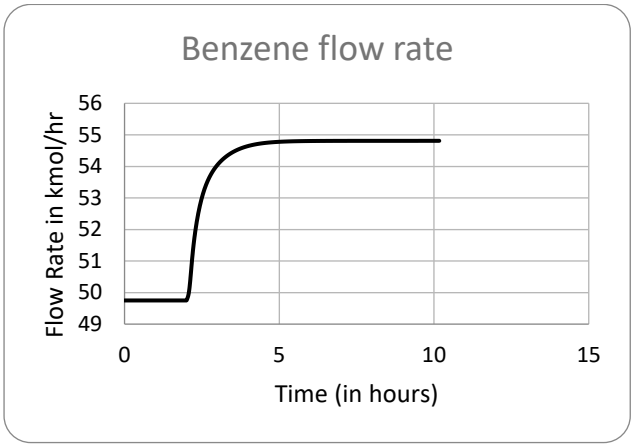
Parameters	Gain	Integral Time	Derivative Time
Pc	**51.1**	**4**	**0**
Tc	**29.95**	**3.5**	**0**

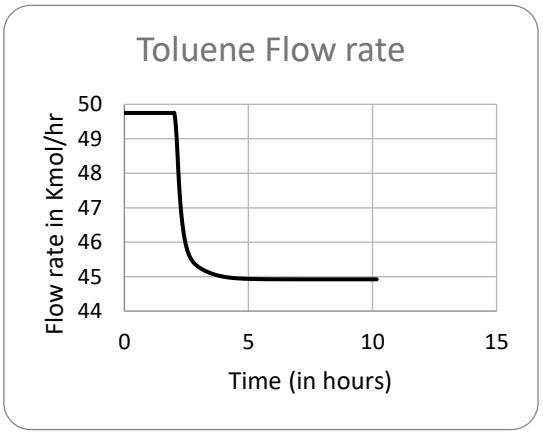
5) i) Transient response for +5% composition



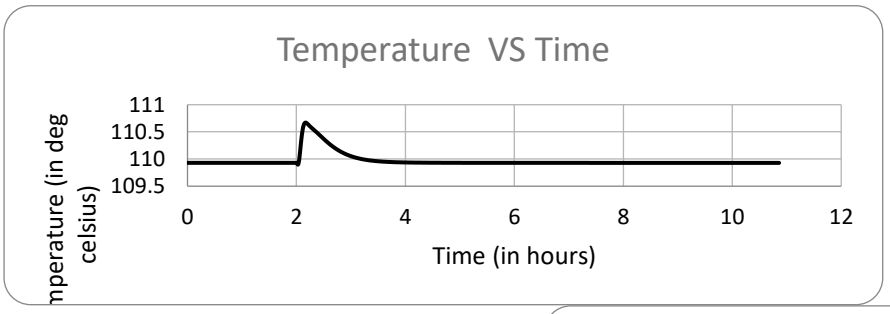


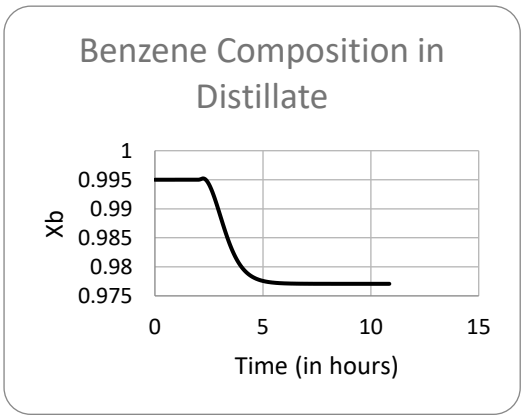


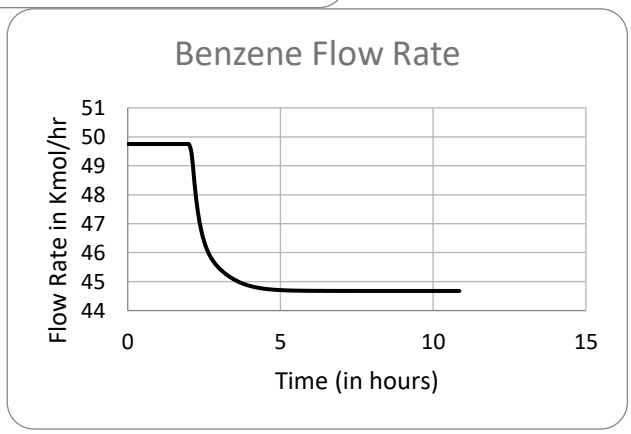


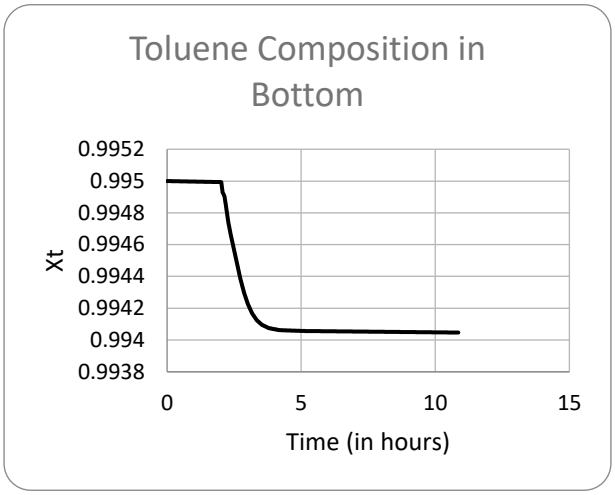


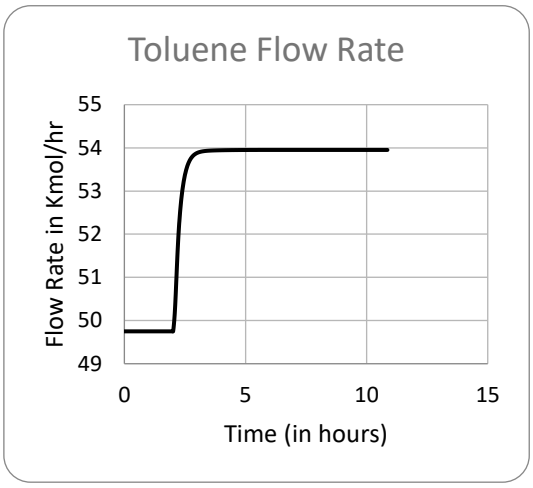
ii) Transient response for -5% composition











iii) Transient response for +10% flow rate