

Read the problem statement carefully



Count the number of processes given in the problem



Draw a schematic flow chart for each process



Label the input and the output streams of all the processes. Also write the components present in the stream along with the name.
This will be helpful later.



Follow a convention while naming the streams.



Count the number of streams and total number of components in the overall process



If N_s is the number of streams and N_c is the total number of components in the process then $(N_s * N_c)$ is the total number of variables.



Draw a table whose columns are streams and a row contains a component in each stream



Assign a variable to all the entries of the column.



Now check for each stream in the flow chart and assign value zero to the components of the stream which are absent.



Check for number of material balances in each process and find the total number of independent material balances.



In general if a process has N components then it has N material balance equations. But take care of recycle streams and other streams with components in proportion and ensure that no equation is repeated while listing down all the final material balance equations.



Count the number of given relations



Perform degree of freedom analysis.



Degree of freedom = Total number of unknown variables - (known variables) - (total independent material balance equations) - (no. of given relations) + (total number of chemical reactions taking place in the process)

Each reaction adds an extra variable i.e. the extent of the reaction.



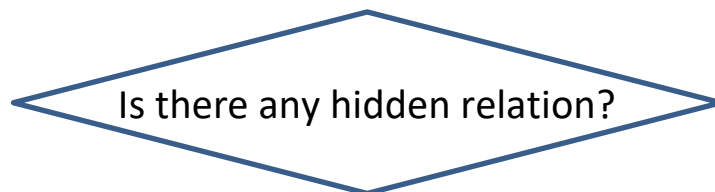
Yes

No



All the variables can be determined

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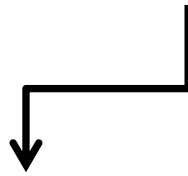
Yes

No



If dof = 0 after including the extra relation then value of all the variables can be determined

Try to club 2 or more processes such that degree of freedom becomes equal to zero.



Assume a basis for the problem statement if not given in the question.



Perform the calculations. Molar flow rate is used for gaseous state and volumetric flow rate is used for liquid state. Units are convertible to one another hence ensure the consistency of the units.