Figure 4.14(c) & 4.14(d) show two other forms of data representation.

4.14(c) is the solute mass fraction in the E vs R plot.

4.14(d) is the mass ratio of glycol/furfural in E vs glycol/water in raffinate.

These plots are not particularly useful since they do not completely define the composition. Their main use is to develop additional tie lines on diagrams of type (a) or (b)

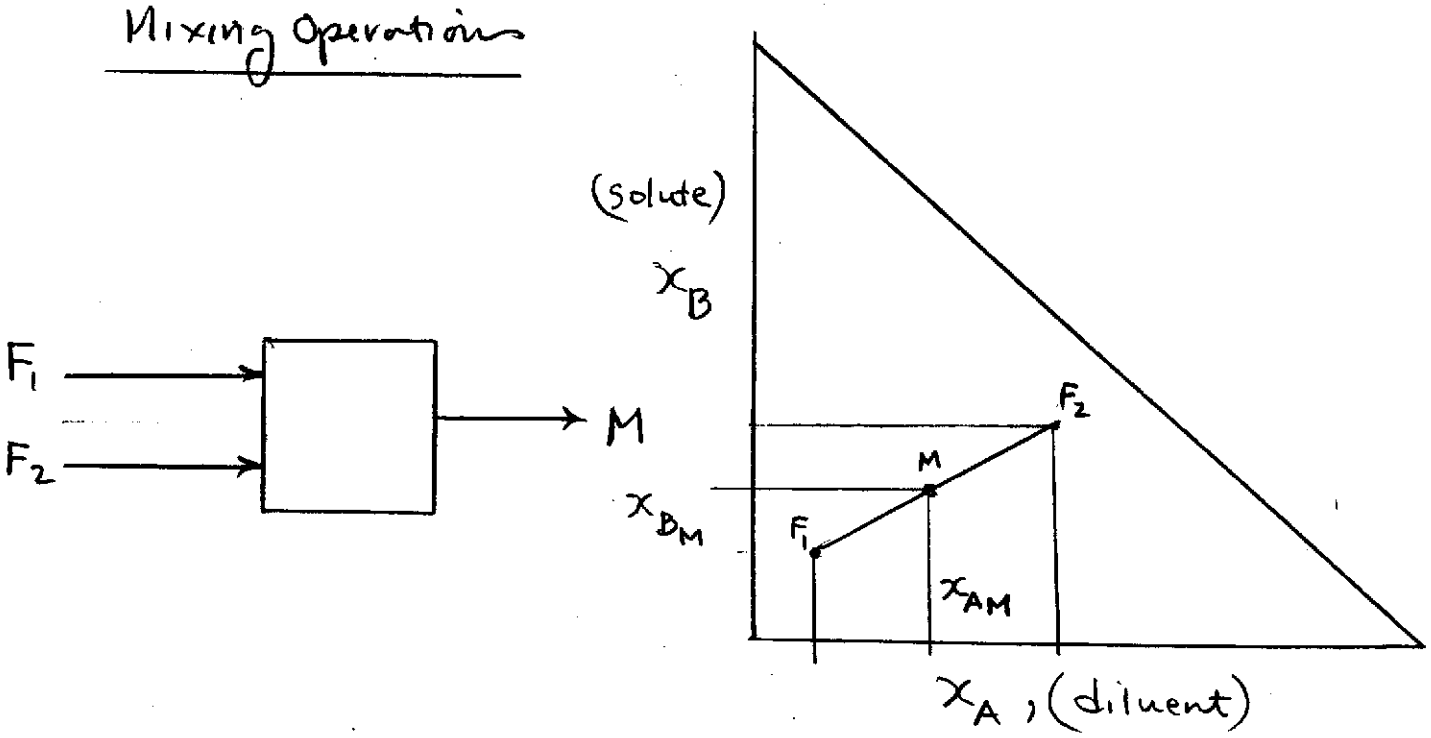
A final type of equilibrium data is the Janecke diagram (Figure 4-14 (e)). Again tie lines connect the E & R values where y-axis is: $\frac{\text{solvent}}{\text{solute + diluent}}$

x-axis is: $\frac{\text{solute}}{\text{solute + diluent}}$.

Figure 4.14(e) is mass ratios but Janecke diagrams are also drawn on mole bases. An example is provided to show the use of the figure.

7-8

Mixing Operations



$F_1 + F_2 = M$: TMB

$F_1 x_{AF1} + F2 x_{AF2} = M x_{AM}$: MB A

$F_1 x_{BF1} + F2 x_{BF2} = M x_{BM}$: MB B

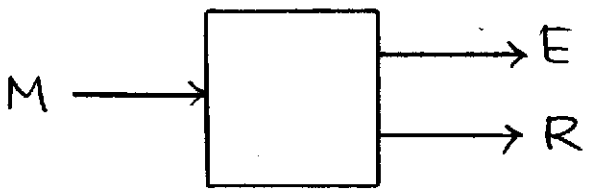
By inverse lever arm rule (ILAR)

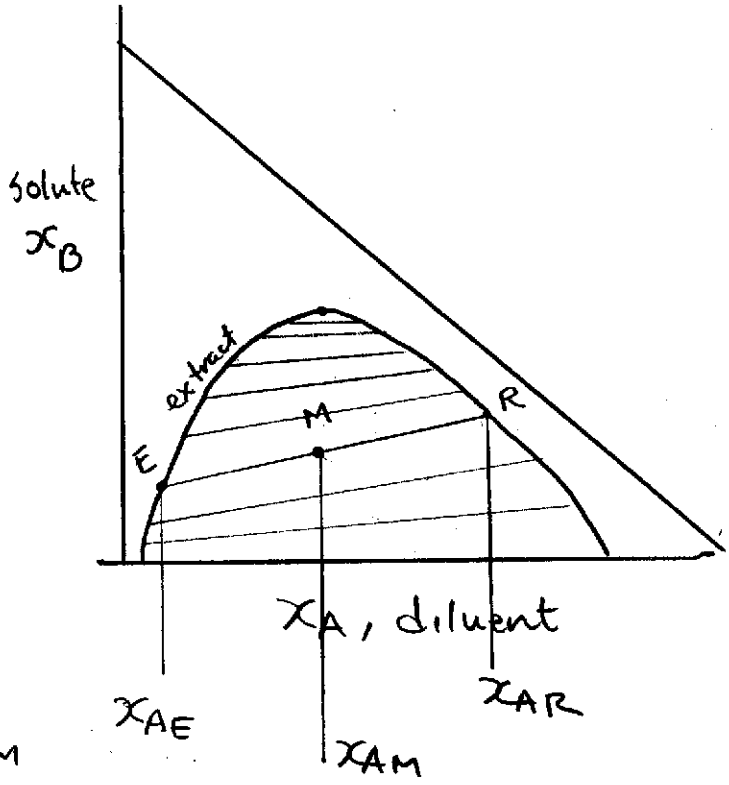
$$\frac{F_1}{F_2} = \frac{\overline{MF_2}}{\overline{MF_1}} = \frac{x_{AF2} - x_{AM}}{x_{AM} - x_{AF1}}$$

or $$\frac{F_1}{M} = \frac{\overline{MF_2}}{\overline{F_1F_2}} = \frac{x_{AF2} - x_{AM}}{x_{AF2} - x_{AF1}}$$

7-9

Unmixing Operations





Using inverse lever arm rule

$$\frac{E}{M} = \frac{\overline{MR}}{\overline{ER}} = \frac{x_{AR} - x_{AM}}{x_{AR} - x_{AE}}$$

and

$$\frac{E}{R} = \frac{\overline{MR}}{\overline{ME}} = \frac{x_{AR} - x_{AM}}{x_{AM} - x_{AE}}$$

7-10

Single (stage) equilibrium contact