lecture-20
SLa

Date 14/03/18

Method of finding optimal solution from the IBFS

Step 1: Find the initial BFS using VAM

Step 2: Determine the collection of u_i, $\{u_i\}_{i=1}^{m}$ and $\{v_j\}_{j=1}^{n}$, such that for each of the allocated cells $c_{ij} = u_{ij} + v_{ij}$.
This is achieved by assigning $u_i = 0$ / $v_j = 0$ depending on the ith row or j-th column with the maximum no. of allocated cells.

Step 3: Calculate $u_i + v_j$ for the non-allocated cells and write on the top left corner of each cell.

Step 4: Construct the cell evaluation table by $\Delta_{ij} = c_{ij} - (u_i + v_j)$ (for allocated cell $\Delta_{ij} = 0$).
If $\Delta_{ij} > 0$ $\forall i, j$ then sol^n is unique and optimal.
If $\Delta_{ij} == 0$ for some i, j and $\Delta_{ij} > 0$ for rest, means sol^n is optimal but not unique.
If $\Delta_{ij} < 0$ for some i, j $\Rightarrow$ not optimal.

Step 5: If the sol^n is not optimal, find the minimum Δ_{ij} and allocate the minimum of the allocated units in row i and column j to the cell i, j.

Step 6: Reassign ~~v_j~~ u_i, v_j to the table corresponding to the new allocation and check for optimality ~~and~~ using the cell evaluation technique.

$c_{i1} = u_1 + v_1 = 17 + (-10)$

$c_{ij} = u_i + v_j$
$13 = ? + 23$

	D_1	D_2	D_3	D_4		u_i
O_1	$\boxed{7}$ / 21	$\boxed{8}$ / 16	$\boxed{-1}$ / 25	(11) / 13	11	-10
O_2	(6) / 17	(3) / 18	$\boxed{9}$ / 14	(4) / 23	13	0
O_3	$\boxed{26}$ / 32	(7) / 27	(12) / 18	$\boxed{32}$ / 41	19	9
	6	10	12	15		
v_j	17	18	9	23		

→ Row with max # allocations

$9 \leftarrow 27 - 18$

We select the row or column with max # of allocations.

Scanned by CamScanner

Cell evaluation : $\Delta_{ij} = C_{ij} - (u_i + v_j)$

14	8	26	0
0	0	5	0
6	6	0	9

⇒ optimal sol^n

cost = 796

Q. Find the optimal sol^n by VAM?

	D_1	D_2	D_3						
O_1	5 / 2	7	4	5	(2)	5(2)	5(5)		
O_2	3	3	8 / 1	~~8~~	(2)				
O_3	5	7 / 4	7	7	(1)	7(4)	7(4)	7(1)	
O_4	2 / 1	2 / 6	10 / 2	14	(1)	14(1)	4(5)	2 4(5)	
	7	9	18 10						
	(1)	(1)	(1)						
	7(1)	9(2)	10(2)						
	2 7(1)	9(2)							
	2(4)	9(2)							

min(14,10)

$u_i + v_j = 1 + 6$

					u_i	
5 / 2	7 / 7	9 / 4	5		1	(2-1)
0 / 3	5 / 2 3	8 6 / 1	8		-1	(1-2)
5	7 / 4	7	7		-2	(4-6)
2 / 1	2 / 6	10 / 2 +2=12	14		0	
7	9	18				

v_j: 1 (1-0), 6 (6-0), 2 (2-0)

Δ_{ij}

0	0	1
3	-2	0
6	0	7
0	0	0

→ one value is negative, so we find a better sol^n.

$$\begin{pmatrix} 5 & 0 & 0 \\ 0 & 2 & 6 \\ 0 & 7 & 0 \\ 2 & 0 & 12 \end{pmatrix}$$

Lecture-21

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D_1 D_2 D_3 u_i

First calculate