TP3

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Find Optimal Solution

Find the optimal solution for the following transportation problem

	D_1	D_2	D_3	D_4	Supply
S_1	2	3	1	5	10
S_2	7	1	3	4	5
S_3	11	7	-	6	15
Demand	5	5	5	10	

Add Dummy Destination

- The total supply is more than the total demand, hence a dummy destination is added.
- Also, one of the costs is not given, which means that location is avoided when making allocations. So, fill that cell with M, a huge cost, so that the cell is left out during redistribution of allocations.

	D_1	D_2	D_3	D_4	D_5	Supply
S_1	2	3	1	5	0	10
S_2	7	1	3	4	0	5
S_3	11	7	M	6	0	15
Demand	5	5	5	10	5	

Find IBFS

- Use NWCR
- This has a degenerate solution, since some of the basic variables are zero

	D_1	D_2	D_3	D_4	D_5	Supply
S_1	2 (5)	3 (5)	1	5	0	10
S_2	7	1 (0)	3 (5)	4 (0)	0	5
S_3	11	7	M	6 (10)	0 (5)	15
Demand	5	5	5	10	5	

Iteration 0

Find u_i and v_j

	D_1	D_2	D_3	D_4	D_5	Supply	u_i
S_1	2 (5)	3 (5)	1	5	0	10	2
S_2	7	1 (0)	3 (5)	4 (0)	0	5	0
S_3	11	7	M	6 (10)	0 (5)	15	2
Demand	5	5	5	10	5		
v_j	0	1	3	4	-2		

Iteration 0

Find $c_{ij} - u_i - v_j$

	D_1		D_2		D_3		D_4		D_5		Supply	u_i
S_1	2	(5)	3	(5)	1	-4	5	-1	0	0	10	2
S_2	7	7	1	(0)	3	(5)	4	(0)	0	2	5	0
S_3	11	9	7	4	M	M-5	6	(10)	0	(5)	15	2
Demand	5		5		5		10		5			
v_j	0		1		3		4		-2			

Iteration 0

- Since both donor cells have the same value (5), they both are candidates for the leaving basic variable
- Choose any one and make the other allocation as 0

	D_1	D_2	D_3	D_4	D_5	Supply	u_i
S_1	2 (5)	3 - (5)	1 ⊞ −4	5 -1	0 0	10	2
S_2	7 7	1 + (0)	3 - (5)	4 (0)	0 2	5	0
S_3	11 9	7 4	M M-5	6 (10)	0 (5)	15	2
Demand	5	5	5	10	5		
v_j	0	1	3	4	-2		

Iteration 1

	D_1	D_2	D_3	D_4	D_5	Supply	u_i
S_1	2 (5)	3 (0)	1 (5)	5	0	10	
S_2	7	1 (5)	3	4 (0)	0	5	
S_3	11	7	M	6 (10)	0 (5)	15	
Demand	5	5	5	10	5		
v_j							

Iteration 1

	D_1		D_2		D_3		D_4		D_5		Supply	u_i
S_1	2	(5)	3	(0)	1	(5)	5	-1	0	0	10	0
S_2	7	7	1	(5)	3	4	4	(0)	0	2	5	-2
S_3	11	9	7	4	M	M-1	6	(10)	0	(5)	15	0
Demand	5		5		5		10		5			
v_j	2		3		1		6		0			

Iteration 1

- Both the donor cells have 0 allocation
- Choose any one and transfer that to the entering basic variable
- Note that no allocation is modified, only the dummy allocation is moved

	D_1	D_2	D_3	D_4	D_5	Supply	u_i
S_1	2 (5)	3 - (0)	1 (5)	5 ⊞ −1	0 0	10	0
S_2	7 7	1 + (5)	3 4	4 - (0)	0 2	5	-2
S_3	11 9	7 4	M M-1	6 (10)	0 (5)	15	0
Demand	5	5	5	10	5		
v_j	2	3	1	6	0		

Iteration 2

	D_1	D_2	D_3	D_4	D_5	Supply	u_i
S_1	2 (5)	3 (0)	1 (5)	5 (0)	0	10	
S_2	7	1 (5)	3	4	0	5	
S_3	11	7	M	6 (10)	0 (5)	15	
Demand	5	5	5	10	5		
v_j							

Iteration 2

	D_1		D_2		D_3		D_4		D_5		Supply	u_i
S_1	2	(5)	3	(0)	1	(5)	5	(0)	0	1	10	0
S_2	7	7	1	(5)	3	4	4	1	0	3	5	-2
S_3	11	8	7	3	M	M-2	6	(10)	0	(5)	15	1
Demand	5		5		5		10		5			
v_j	2		3		1		5		-1			