

Assignment 10 for MAT3210 (6.1-6.4)
(no need to hand in)

Problem 1 Consider the following transportation problem

	Destination				Supply
Origin	$c_{11} = 2$	$c_{12} = 3$	$c_{13} = 4$	$c_{14} = 1$	20
	$c_{21} = 1$	$c_{22} = 3$	$c_{23} = 5$	$c_{24} = 6$	30
Demand	10	20	10	10	

- (a) Write down the transportation problem.
- (b) Write down the matrix A . What is the rank $(A) = ?$
- (c) Write down the dual problem.
- (d) Find a square matrix B inside A such that B is non-singular and the size of B is the rank (A) .
- (e) Use stepping stone theorem to write all the other a_{ij} in terms of the columns in B.

Problem 2 In Problem 1, suppose that the transportation tableau is

x_{11}	x_{12}		
	x_{22}	x_{23}	x_{24}

Find out the basic solution and the basic matrix B . Write all other columns of A in terms of columns of B . Compute $z_{ij} - c_{ij}$. Find out the entering variable and leaving variable.

Problem 3 Consider the following transportation model

					Supply
	10	2	20	11	15
	12	7	9	20	25
	4	14	16	18	10
demand	5	15	15	15	

- (a) What is the rank (A)?
- (b) Use least-cost method to obtain a starting BFS.
- (c) Compute the starting objective value.
- (d) Obtain the transportation tableau. Find out the basic matrix B , write all other columns of A in terms of columns of B . Compute $z_{ij} - c_{ij}$.
- (e) Determine the entering and leaving variables and obtain the next transportation tableau.

Problem 4. Do the same as in Problem 3 for the following transportation problem

					Supply
	5	1	8		12
	2	4	0		14
	3	6	7		4
demand	9	10	11		