Finest Budget for Secure Tetragonal Lattice TPM in Alleyway Graphical Methodology

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Article History: Received: 11 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 28 April 2021

Abstract: The proposed method provides the Optimum Basic Feasible Solution for the given balanced TPM through graphical method. This proposed method which is derived by this methodology is 100% matching with VAM and LCM. All the derived paths of this model provide OBFS with any one of the so called method.

Keywords: Maximum, Minimum, Optimization, Path, Pivot

1. Introduction

Logististics provides comfort in travelling from one place to other place. The facility consists in shipment of equipments or materials include lot of hurdles and challenges [1]-[4]. One of these hurdles that come across in shipping materials is to lessen the charges that exceed at par with the expected expenses.

Some the shipping models by land, air, water, wireless technologies have some limits as capacity and time windows. These limits can be approached and sort out with the help of operation research [5]. This particular operation research field paves an excellent tool in governance. It can definitely surpass some of the tools in the software and Data Analytics [6]. Professionals who are experts in Operation Research field can contribute more in corporates. They can establish entire sets of data and examine all the options opened for the processes. This Operation Research canInfer most of the feasible outcomes and insecure assessments. Establishing enterprises can be enhanced by Operation Research or utilizing some samples to identify which is the best solving technique [7] & [10].

Operation Research is a term that incorporates lots of application in methods and techniques for analytical problems. It also methodically solves enormous issues in control of the system with required solutions [8] & [9]. Operation Research provides the best alternative remedy for a management which may face any kind of challenges.

Nomenclature:

VAM - Vogel's Approximation Method

LCM - Least Cost Method

NWC - North West Corner Method

TPM - Transportation Problem Model

OBFS - Optimal Basic Feasible Solution

BFS - Basic Feasible Solution

Corollary 1:

There exists a lower and upper limit as a path of length (m+n-1)-1 to (m+n-1) interms of degeneracy condition of the path.

Corollary2:

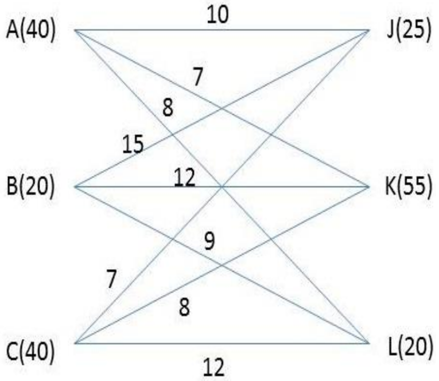
There exists a optimum basic feasible solution for TPM as a path of length 3.

Example :

TPM :

	J	**K**	**L**	**Supply**
A	10	7	8	40
B	15	12	9	20
C	7	8	12	40
Demand	25	55	20	100

Graphical Representation of the given TPM:



Start up from A:

S.NO	**PATH**	**WEIGHT**	**COST**	**ALLOTED CELL**
1	P1: AJCKBL	46	755	((2,3),180), ((3,1), 175), ((3,2), 120), ((1,2),280)
2	P2: AKCJBL	46	755	((1,2),280), ((2,3),180), ((3,1),175), ((3,2),120)
3	P3:AKCLBJ	51	755	((1,2), 280), ((2,3), 180), ((3,2), 120), ((3,1),175)
4	P4:ALBKCJ	44	755	((2,3),180), ((3,1), 175), ((3,2), 120), ((1,2),280)
5	P5:AKBLCJ	47	755	((1,2), 280), ((2,3), 180), ((3,1), 175), ((3,2), 120)
6	P6:AJBLCK	54	855	((1,1), 250), ((2,3), 180), ((3, 2), 320), ((1,2), 105)
7	P7:AJCLBK	50	855	((1,1), 250), ((2,3), 180), ((1,2), 105), ((3,2), 320)
8	P8:ALBJCK	47	895	((1,3), 160), ((2,1), 300), ((3,1), 35), ((3,2), 260),((1,2), 140)
9	P9:AKBJCL	53	915	((1,2), 280), ((2,1), 75), ((2,2), 180), ((3,1), 140),((3,3), 240)
10	P10:ALCJBK	54	915	((2,2), 240), ((3,1), 140), ((3,3), 240), ((1,1), 50),((1,2), 245)
11	P11:AJBKCL	57	995	((1,1), 250), ((2,2), 240), ((3,2), 160),((3,3),240), ((1,2),105)
12	P11:ALCKBJ	55	995	((2,2), 240),((3,2), 160), ((3,3), 240),((1,1), 250),((1,2), 105)

Start up from B:

S.NO	PATH	WEIGHT	COST	ALLOTED CELL
1	P1: BLAKCJ	39	755	((2,3),180), ((3,1),175), ((1,2),280),((3,2),120)
2	P2: BJALCK	53	785	((1,1),200), ((1,3),160),((2,1),75),((3,2),320),((2,2),30)
3	P3: BLCKAJ	46	855	((1,1),250),((1,2),105),((2,3),180),((3,2),320)
4	P4: BLAJCK	42	855	((1,1),250),((1,2),105),((2,3),180),((3,2),320)
5	P5: BLCJAK	45	855	((1,1),250),((1,2),105),((2,3),180),((3,2),320)
6	P6: BKALCJ	46	880	((1,2),245),((1,3),40),((2,2),240),((3,1),175),((3,3),180)
7	P7: BJCKAL	45	915	((1,2),140),((1,3),160),((2,1),300),((3,1),35),((3,2),280)
8	P8: BKAJCL	48	915	((1,1),50),((1,2),245),((2,2),240),((3,1),140),((3,3),240)
9	P9: BKCJAL	45	915	((1,1),200),((1,3),160),((2,2),240),((3,1),35),((3,2),280)
10	P10: BJCLAK	49	915	((1,2),140), ((1,3), 160), ((3,1),175), ((2,2), 40), ((3,2), 120)
11	P11: BKCLAJ	50	950	((1,1),250),((1,3),120),((2,2),240),((3,2),280),((3,3),60)
12	P12: BJAKCL	52	995	((1,1),250),((1,2),105),((2,2),240),((3,2),160),((3,3),240)

Start up from C:

S.NO	PATH	WEIGHT	COST	ALLOTED CELL
1	P1: CJAKBL	45	755	((1,2),280),((2,3),180),((3,1),175),((3,2),120)
2	P2: CJBLAK	46	755	((1,2),280),((2,3),180),((3,1),175),((3,2),120)
3	P3: CKAJBL	49	755	((1,2),280),((2,3),180),((3,2),120),((3,1),175)
4	P4: CJBKAL	49	835	((1,2),140),((1,3),160),((2,2),240),((3,1),175),((3,2),120)
5	P5: CLBKAJ	50	855	((1,1),250),((1,2),105),((2,3),180),((3,2),320)
6	P6: CLBJAK	53	855	((1,1),250),((1,2),105),((2,3),180),((3,2),320)
7	P7: CLAKBJ	54	880	((1,2),245),((1,3),40),((2,2),240)((3,3),180),((
8	P8: CJALBK	46	915	((1,1),250),((1,3),120),((2,2),180),((2,3),45),((3,2),320)
9	P9: CKALBJ	47	915	((1,2),140),((1,3),160),((2,1),300),((3,2),280),((3,1),35)
10	P10: CKBLAJ	47	915	((1,1).200),((1,3),160),((2,2),240),((3,2),280),((3,1),35)
11	P11: CKBJAL	53	915	((1,1),200),((1,3),160),((2,2),240),((3,2),280),((3,1),35)
12	P12: CLAJBK	57	935	((1,1),200),((1,3),160),((2,1),75),((2,2),180),((3,2),320)

Algorithm:

Step 1: Draw an equivalent edge weighted connected graph $G(V,E)$ corresponding to given TPM.

Step 2: List out all possible paths from certain starting point which covers maximum number of other points once.

Step 3: Shade the cost which is weight of the corresponding two vertices of the paths.

Step 4 : Choose the least element which occur in supply or demand and allot that cost to the minimum value corresponding to the row and column of the shaded cell if possible.

Step 5: Repeat Step 4 until degeneracy condition is satisfied.

Step 6: Compute the cost value based on Step 5.

Applying Proposed Algorithm:

Step: 1

	J	K	L	Supply
A	10	7	8	40
B	15	12	9(20)	0
C	7	8	12	40
Demand	25	55	0	100

Step: 2

	J	K	L	Supply
A	10	7	8	40
B	15	12	9(20)	0
C	7(25)	8	12	15
Demand	0	0	0	100

Step: 3

	J	K	L	Supply
A	10	7(40)	8	0
B	15	12	9(20)	0
C	7(25)	8(15)	12	0
Demand	0	0	0	100

Step: 4

Optimum cost = (7*40)+(9*20)+(7*25)+(8*15) =280+180+175+120 =755

2. COMPARITIVE ANALYSIS WITH EXISTED METHODS:

OBFS COMPARISON WITH VAM AND LCM:

S.NO	START UP	PATH	COST	VAM & LCM	ACCURACY %
1	A	P1,P2,P3,P4,&P5	755	755	100.00
	B	P1			
	C	P1,P2,&P3			
AVERAGE ACCURACY for (9 PATHS)					**100**

OBFS COMPARISON WITH NWC:

S.NO	START UP	PATH	COST	NWC	ACCURACY %
1	A	P1,P2,P3,P4&,P5	755	995	131.79
	B	P1			
	C	P1,P2,&P3			
2	C	P4	835		119.16
3	A	P6,&P7	855		116.37
	B	P3,P4,P5,&P6			
	C	P5,&P6			
4	B	P7	880		113.07
	C	P7			
5	A	P8	895		111.17
6	A	P9,&P10	915		108.74
	B	P8,P9,P10,&P11			
	C	P8,P9,P10,&P11			
7	C	P12	935		106.42
8	B	P12	950		104.74
9	A	P11,&P12	995		100
	B	P12			
AVERAGE ACCURACY (9 PATHS)					115.89

3. Results &Conclusion:

AVERAGE ACCURACY	ACCURACY %
COMPARISON WITH VAM & LCM	100.00
COMPARISON WITH NWC	115.89
OVERALL ACCURACY IN % for (36 PATHS)	**107.95**

4. Acknowledgement:

The authors would like to thank Prof. PonnammalNatarajan, Former Director of Research & Development, Anna University, Chennai, and Professor E.G. Rajan, Senior Scientist, Pentagram Research Centre, Hyderabad, for their intuitive ideas and fruitful discussions with respect to the paper's contribution and support to complete this work.

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