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RESEARCH ARTICLE

NEEYA? NAANA? – SOME RECENT DIRECT METHODS VERSUS SOME CHALLENGING PROBLEMS IN TRANSPORTATION PROBLEMS

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Abstract

In this research article, the twelve 'direct methods' developed by different researchers to solve Transportation Problems (TPs) during the period 2012 – 2021 is considered as *one group* and twenty one 'challenging TPs' (balanced and unbalanced) identified and acknowledged from various published articles and textbooks is considered as *another group*. We assess and discuss the performance of each of the direct methods on the challenging TPs. and brings out the fact and fantasy. Our aim is to encourage and motivate the future author(s) to develop better and best methods to deliver optimal solutions directly to all the TPs. Most of the direct methods introduced are easy to understand, easy to apply, consumes less time, innovative and different from the existing methods. We appreciate the contributions of the authors. However, in reality, testing outcomes by their methods on the challenging TPs authenticate that no one method has produced optimal solution directly to all the identified TPs. Consequently, no author(s) can claim that their introduced method is direct. Each 'direct method' introduced is just a method to generate an initial basic feasible solution (IBFS) only and not a direct method. The added advantage of this article is to assess the performance of any innovative method presented on TP in the future, the acknowledged 'challenging problems' may be trialed for testing and validating the proposed novel method. Really, the identified 'challenging problems' create a challenge to the 'direct methods'.

Introduction:-

Throughout the world, the advancement in different types of modes of transport, ways of transport and other developed facilities have forced to study and research in transportation problems in detail and to find ways and means to minimize the overall transportation cost. During 1960s the methods such as North West Corner Method (NWCM), Least Cost Method (LCM) and Vogel's Approximation Method (VAM) [5] were developed in order to find just a solution alone to a given TP. Among these methods, VAM was a better one to produce an Initial Basic Feasible Solution (IBFS) and has been in use for more than six decades. Later, in order to test the optimality of an obtained solution and to improve it, if not optimal, a well-known method called MODI (Modified Distribution) [5] was developed. It is the best method to test the optimality of a solution in the literature along with the Stepping

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Stone method. Thereby, solving a TP becomes a two stage process. First stage is finding an IBFS to a given TP and the second one is testing its optimality and improving it, if not optimal.
During the past one decade (2012 – 2021) and also before that numbers of methods have been proposed to find an IBFS and as well as direct methods to find an optimal solution of TPs. In 2012, Abdul Quddoos and et al. [1] introduced a zero allocations direct method called ASM, and its revised version in 2016 [2], to generate an optimal solution directly to a wide range of TPs. Murugesan R. and Esakkiammal T. [10] showed through some illustrative TPs that the ASM method is the method to generate best IBFS only and not a direct method to generate the optimal solution. By identifying some difficulties in the allocation process when tie occurs among certain 0-entry cells, Murugesan R. and Esakkiammal T. [11] improved the existing ASM method and named it as IASM method and showed that the later produces better IBFS than the best IBFS produced by the ASM method. In 2021, Esakkiammal T. and Murugesan R. [4] proposed an innovative zero allocations approach named SOFTMIN which produces optimal solutions to most of the TPs. In 2022, Murugesan R. [9] established that the SOFTMIN method performs much better than the IASM method, but not a direct method to produce optimal solution to any given TP. The other direct methods developed during the period 2012 – 2021 and their reality in producing the nature of solution are discussed in the following section.

Direct Methods To TPs: Facts and Fantacy in Generating Optimal Solutions:-
In the literature more number of direct methods are available to produce optimal solutions of balanced cost minimization TPs directly. Assessment of each of the direct methods developed during the period 2012 – 2021 is summarized below.

Developed Method for Optimal Solution of TP:-
Poojan Davda and Jaimin Patel (2019) [13] proposed a new method which considers ‘second minimum value’ of each row and each column of a transportation table as the penalty value. (Recall that, in VAM penalty value is defined as the difference of lowest and next to lowest cost in each row and column of a transportation table.) Then they allocate the maximum possible units at the least cost cell corresponding to the highest penalty value in the row or column. Ties are broken arbitrarily. The satisfied row or column is deleted. Penalties are revised and the procedure is continued until all the rim conditions are satisfied. Actually, it is a simple and less iteration method developed by two students while studying their undergraduate engineering course. We appreciate their work in their young age.

According to the authors, by testing only two balanced TPs (BTPs) they conclude that the solution obtained by the proposed method is optimal with less iteration compared to other methods. They also say that the developed method is effective for both the large and small size transportation problem. But, by our testing the proposed direct method has not produced optimal solution even to most of the small size TPs.

A Novel Method to find an Optimal Solution for TPs
Sirisha J. andViola A. (2018) [17] proposed a novel method to find an optimal solution for TPs. In the given BTP, first they interchange the odd rows and interchange the even rows. Next, they interchange the odd columns and interchange the even columns. In the resultant matrix they apply the row minimum subtraction operation followed the column minimum subtraction operation to obtain the reduced cost matrix with at least one zero element in each row and in each column. Then they choose a single zero in each row and assigning the least value of the supply or demand whichever is minimal. After assigning the values, subtraction of the other is done. More than one zero can be assigned to one and crossed on the other. Next, they allocate the minimum of supply/demand on the left bottom of the smallest entry in the cell (i, j) of the transportation table. Really, this novel method is easy, flexible and avoids more number of iterations for a given TP. In this regard, we appreciate the contribution of the authors.

By testing their method on three BTPs, they say that the results obtained are either equal to the MODI method or even less than that (!!!). By the authors, in all the other methods such as NWCM, LCM, VAM, and also MODI method, IBFS is calculated before finding the optimal solution. But, in this novel method as proved in this study, the problem can be solved directly and optimal solution is obtained. These are all not true by our testing on the challenging problems. Also, the ways of interchanging odd (even) rows and interchanging of odd (even) columns are not provided when the size of the cost matrix is more than four.

A New Method for Optimal Solutions of TPs in LPP:-

Muhammad Hanif and Farzana Sultana Rafi (2018) [8] proposed a new method for finding optimal solutions of TPs in LPP. In this new method, the authors make the allocation in the south west corner (SWC) of the transportation table. It is actually a SWCM (like the NWCM).

The most attractive feature of this method is that it requires very simple arithmetical and logical calculation, that's why it is very easy even for layman to understand and use.We appreciate the effort of the authors. We know that the NWCM is the worst method and the VAM is somewhat better one. The authors have accepted the limitations of the proposed method that they could not reach the better solution comparatively from the VAM. Therefore, obviously this method is not direct.

A New Approach for Optimal Solution of TP:-

Madhavi M. (2018) [6] proposed a new approach to find an optimal solution for TPs. For the given BTP, first the approach finds an IBFS by selecting the minimum and next to minimum in each row, then applies an iterative looping technique, starting and ending at a highest cost basic cellin such a manner that atleast one basic cell will leave and the loop must pass through the minimum cost cells than the highest cost, to arrive at an optimal solution. Finding an IBFS by this method is very easy and different. But, it requires improvement towards optimality by a new looping approach. We appreciate the innovative works of the authors. As this method is two stage process, it is not a direct method, for generating the optimal solution of a TP directly. Also, the iterative looping technique starting and ending at the highest cost basic cell does not guarantee the reduction in the overall transportation cost.

On Optimal Solution of a TP:-

Reena G. Patel, Bhavin S. Patel and P. H. Bhathawala (2017) [15] developed a new method which first finds the IBFS to the given BTP using NWCM, LCM or VAM, then applies a new test for optimality in order to improve the obtained IBFS. Thereby, the authors give the idea for the optimality in comparison with MODI method. Also, in the conclusion, according to the authors there are possible extensions to improve their algorithm of the method.Consequently, it is not a direct method, for generating the optimal solution of a TP directly. However, we appreciate the new idea on the test for optimality.

A Direct Method to obtain an Optimal Solution in theTP:-

Seethalakshmy A.and. Srinivasan N. (2016) [16] proposed a new method called "SS"for deriving an optimal solution towards TP. By this method, an optimal solution is evinced by row/column reduction to form a transformed matrix by the systematic allocation of zero by position. Actually, this method follows the steps of the ASM method, but not with in detail. Nothing is new in this method. According to the authors, this method solves the problem optimally. But, in reality it fails to generate optimal solution to most of the problems as the ASM method also fails to generate optimal solution for some challenging TPs

A New Simple Method of Finding an Optimal Solution for theTP:-

Veena Shalani V. and Srinivasan N. (2016) [19] proposed a new method which finds an optimal solution without requiring an IBFS. In this method the number of allocations (m+n-1) is satisfied for all problems. This method does not require arithmetical and logical calculation. This method selects the minimum odd cost value from the whole cost matrix of the BTP and subtract the same from each of the odd cost valued cells of the whole matrix. It will ensures that all the cost values in the transportation table with only even numbers and zeros. Next, allocation is done for zeros, Consider (i, j)th zero position where there is minimum demand / minimum supply. After allocation delete the row / column. Next, identify the minimum even cost from the reduced table and subtract the same cost from all the cost cells. Then, identify the zeros for allocation as usual. If there are more than one zero positions, identify the cell (for allocation) where minimum demand / minimum supply of the transportation table. The process is repeated until the demand and supply are exhausted. Now it can be verified that (m+n-1) allocations are allotted in total.

Actually, this method providesa systematic and easy way to find optimal solution for TP without degeneracy and IBFS. Also, while comparing to other methods, it is easy to calculate and we get the required solution in few steps. We appreciate the novel idea of the authors. But, by our testing, the proposed direct method has not produced optimal solution to most of the small size TPs. For a sample, refer the illustrative example shown in Section 3.1.

A Direct Analytical Method for finding an Optimal Solution for TP:-
Wali Ullah M. et al. (2015)[20] presenteda "Direct Analytical Method" for finding an optimal solution for a wide range of TPs directly. The sequence of steps involved in the method are as follows:

Step 1: Select the first column D1 (destination) and verify the row (source) which has minimum unit cost. Write that destination D1 under "Column-1"and corresponding source under "Column-2". Continue this process for each destination. However, if any destination has more than one same minimum value in different sources then write all these sources under Column-2.
Step 2: Select those destinations under Column-1 which have unique source. For example, under Column-1, destinations are D1, D2, D3 have minimum unit cost which represents the sources S1, S1, S3 written under Column-2 respectively. Here S3 is unique and hence allocate cell (S3, D3) a minimum of demand and supply. Next, delete that row/column where supply/demand is exhausted.
Step 3: If source under Column-2 is not unique, then select those destinations where sources are identical. Next, find the difference between minimum and next minimum unit cost for all those destinations where sources are identical.
Step 4: Check the destination which has maximum difference. Select that destination and allocate a minimum of supply and demand to the corresponding cell with minimum unit cost. Delete that row/column where supply/demand is exhausted. If the maximum difference for two or more than two destinations appear to be same, then find the difference between minimum and next to next minimum unit cost for those destinations and select the destination having maximum difference. Allocate a minimum of supply and demand to that cell. Next,delete that row/column where supply/demand is exhausted.Repeat the above steps until all the supplies are distributed.

The proposed method is very easy to understand, easy to apply, consumes less time and innovative also. Thereby, we appreciate the authors for their innovative ideas presented in this paper. However, this method has not produced optimal solution to many problems. A sample problem is isillustrated in Section 3.2.

An Innovative Approach for finding the Optimal Solution forTPs:-
Srinivasan N. and Iranian D. (Aug. 2015) [18] proposed a new method,named "SI", for finding an optimal solution for all TPs. It is a direct method where we do not require basic feasible solutions. Actually, this method follows the same steps of the ASM method and hence definitely "SI" method will not produce optimal solutions directly to all the TPs. This is confirmed as we [9, 11] have showed that the ASM method as well as its improved version IASM method have not produced optimal solutions to most of the challenging TPs listed.

The Advanced Method for the Optimum Solution ofTPs:-
Reena G Patel, P. H. Bhathwala (2014) [14] proposed a new method named "Advanced Method", for finding an optimal solution of TPs. According to Meenakshi [7] this method does not give a solution nearly comparable to MODI method as claimed by the authors. In most of the TPs difference between the transportation costs given by both the methods are very high. Even in most of the cases VAM gives a better feasible solution than the Advanced Method. The author Meenakshi proved her claim using three examples.

Revised Distribution Method of finding Optimal Solution forTPs:-
Aramuthakannan S. and Kandasamy P.K. (2013) [3] introduced a new approach to TP namely, Revised Distribution method (RDI), for solving a wide range of such problems. The new method is based on allocating units to the cells in the transportation matrix starting with minimum demand or supply to the cell with minimum cost in the transportation matrix and then try to find an optimum solution to the given transportation problem. In fact, the procedure of this method is systematic, easy to apply and innovative. We appreciate the innovative ideas presented in their paper. However, by testing their algorithm just for one TP, they claim that their method produces optimal solution to a wide range of TPs. It is not acceptable.The reason can be seen from the illustrative example shown in Section 3.3.

A New method for finding an optimal solution forTPs:-
Abdul Quddoos and et al. (2012) [2, 3] introduced a new direct method named 'ASM', for solving a wide range of such problems. We [12] proved that this method will not produce optimal solution to most of the TPs.

Illustrative Example:-
Consider the following challenging cost minimizing balanced TP with four sources and six destinations, which is shown in Table 1.

Table 1:- The given TP.

Sources	Destinations						Supply
	D1	D2	D3	D4	D5	D6	
S1	1	2	1	4	5	2	**30**
S2	3	3	2	1	4	3	**50**
S3	4	2	5	9	6	2	**75**
S4	3	1	7	3	4	6	**20**
Demand	**20**	**40**	**30**	**10**	**50**	**25**	**175**

Solution by the New Method due to Veena Shalani V. and Srinivasan N. (Dec. 2016):-

By applying the steps of the New Method due to Veena Shalani V. and Srinivasan N., one can get the feasible allocations in the order shown in Table 2. As a result, the overall transportation cost computed is $510, which is not the minimum one as tested by the MODI method. Actually, the minimum overall transportation cost is $430 and is shown in Table 3. Therefore, the New Method is not a direct method to produce the optimal solution.

Table 2:- Solution with the overall transportation cost by the New Method.

Allocated Cells in order	Allocated Quantity	Original Cost	Quantity × Cost
(S2, D4)	10	1	010
(S1, D1)	20	1	020
(S1, D3)	10	1	010
(S4, D2)	20	1	020
(S2, D2)	20	3	060
(S2, D3)	20	2	040
(S3, D6)	25	2	050
(S3, D5)	50	6	300
		Overall transportation cost	**510**

Table 3:- Optimal Solution with the minimum overall transportation cost.

Allocated Cells row-wise	Allocated Quantity	Original Cost	Quantity × Cost
(S1, D1)	10	1	010
(S1, D3)	20	1	020
(S2, D3)	10	2	020
(S2, D4)	10	1	010
(S2, D5)	30	4	120
(S3, D1)	10	4	040
(S3, D2)	40	2	080
(S3, D6)	25	2	050
(S4, D5)	20	4	080
		Minimum overall transportation cost	**430**

Solution by the Direct Analytical Method:-

By applying the steps of the Direct Analytical Method due to Wali Ullah M. et al. (2015), one can get the allocations in the order shown in Table 4. As a result, the overall transportation cost computed is $440, which is not the minimum one as tested by the MODI method. Actually, the minimum overall transportation cost is $430 and is shown in Table 3. Therefore, the Direct Analytical Method is not a direct method to produce the optimal solution.

Table 4:- Solution with the overall transportation cost by the Direct Analytical Method.

Allocated Cells in order	Allocated Quantity	Original Cost	Quantity × Cost
(S3, D6)	25	2	050
(S2, D4)	10	1	010

(S2, D5)	40	4	160
(S1, D3)	30	1	030
(S3, D1)	20	4	080
(S4, D5)	10	4	040
(S4, D2)	10	1	010
(S3, D2)	30	2	060
Overall transportation cost			**440**

Solution by the Revised Distribution Method:-

By applying the steps of the Revised Distribution Method due to Aramuthakannan S. and Kandasamy P.R. (2013), one can get the allocations in the order shown in Table 5. As a result, the overall transportation cost computed is \$510, which is not the minimum one as tested by the MODI method. Actually, the minimum overall transportation cost is \$430 as shown in Table 3. Therefore, the Revised Distribution Method is not a direct method to produce the optimal solution.

Table 5:- Solution with the overall transportation cost by the Revised Distribution Method.

Allocated Cell in order	Allocated Quantity	Original Cost	Quantity × Cost
(S2, D4)	10	1	010
(S1, D1)	20	1	020
(S1, D3)	10	1	010
(S4, D2)	20	1	020
(S2, D3)	20	2	'040
(S3, D2)	20	2	040
(S2, D6)	20	3	060
(S3, D6)	05	2	010
(S3, D5)	50	6	300
Overall transportation cost			**510**

Some Challenging TPs for Direct Methods:-

In order to evaluate and assess the performance of a 'direct method' introduced in TPs, a set of 21 identified and acknowledged 'challenging TPs' of balanced and unbalanced categories have been listed in Table 6. Each of the direct methods, discussed in Section 2, has been tested on these challenging TPs. The role of the 'challenging problems' is only to shape and ensure the new algorithms in a better way. There cannot be any 'direct method' without solving the identified 'challenging problems'. Actually, the identified challenging problems make a challenge to the direct methods. That is why in the title, Neeya? Naana? (You? or I?).

Table 6:- A set of some challenging balanced and unbalanced TPs.

BTP Problem #	**UTP Problem #**
Problem 1 [C_{ij}] 3×3= [16 20 12; 14 818; 26 24 16] [S_i] 4×1= [20, 16, 9] [D_j] 1×4= [18, 12, 15]	**Problem 1** [C_{ij}] 3×3= [6 10 14; 12 19 21; 15 14 17] [S_i] 3×1= [50, 50, 50] [D_j] 1×3= [30, 40, 55]
Problem 2 [C_{ij}] 3×5= [1 9 13 36 51; 24 1216 20 1; 14 33 1 23 26] [S_i] 3×1= [50, 100, 150] [D_j] 1×5= [100, 70, 50, 40,40]	**Problem 2** [C_{ij}] 3×3= [11 21 16; 7 17 13; 11 23 21] [S_i] 3×1= [14, 26, 36] [D_j] 1×3= [18, 28, 25]
Problem 3 [C_{ij}] 4×4= [7 5 9 11; 4 3 8 6; 3 8 10 5; 2 6 7 3] [S_i] 4×1= [30, 25, 20, 15] [D_j] 1×4= [30, 30, 20, 10]	**Problem 3** [C_{ij}] 3×3 = [15, 22, 17; 11, 17, 16; 20, 25, 21] [S_i] 3×1= [20, 25, 40] [D_j] 1×3= [35, 45, 30]
Problem 4 [C_{ij}] 4×5= [25 14 34 46 45; 10 47 14 20 4; 22 42 38 21 46; 36 20 41 38 44] [S_i] 4×1= [27, 35, 37, 45] [D_j] 1×5= [22, 27, 28, 33, 34]	**Problem 4** [C_{ij}] 3×4= [19 30 50 10; 70 30 40 60; 40 8 70 20] [S_i] 3×1= [7, 9, 18] [D_j] 1×4= [40, 8, 7, 14]

Problem 5 $[C_{ij}]$ 4×5= 4 9 810 12; 6 10 3 2 3; 3 2 7 10 3; 3 5 5 4 8] $[S_i]$ 4×1= [24, 18, 20, 16]$[D_j]$ 1×5= [10, 20, 10, 18, 20]	**Problem 5** $[C_{ij}]$ 3×4= [10 15 12 12; 8 10 11 9; 11 12 13 10] $[S_i]$ 3×1= [20, 15, 12] $[D_j]$ 1×4= [14, 12, 8, 22]
Problem 6 $[C_{ij}]$ 4×6= [1 2 1 4 5 2;3 3 2 1 4 3;4 2 5 9 6 2;3 1 7 3 4 6] $[S_i]$ 4×1= [30, 50, 75, 20] $[D_j]$ 1×6= [20, 40, 30, 10, 50, 25]	**Problem 6** $[C_{ij}]$ 3×4= [42 48 38 37; 40 49 52 51; 39 38 40 43] $[S_i]$ 3×1= [160, 150, 190] $[D_j]$ 1×4= [80, 90, 110, 160]
Problem 7 $[C_{ij}]$ 5×4= [10 20 5 7; 13 9 12 8; 4 15 7 9; 14 7 1 1; 3 12 5 19] $[S_i]$ 5×1= [200, 300, 200, 400, 400] $[D_j]$ 1×5= [500, 600, 200, 200]	**Problem 7** $[C_{ij}]$ 3×5= [10 8 12 9 3; 4 4 6 6 7; 15 7 11 13 8] $[S_i]$ 3×1= [15, 12, 16] $[D_j]$ 1×5= [8, 8, 4, 7,6]
Problem 8 $[C_{ij}]$ 5×5= [73 40 9 79 20; 62 93 96 8 13; 96 65 80 50 65; 57 58 29 12 87; 56 23 87 18 12] $[S_i]$ 5×1= [8, 7, 9, 3, 5] $[D_j]$ 1×5= [6, 8, 10, 4, 4]	**Problem 8** $[C_{ij}]$ 4×3= [2 7 14; 3 3 1; 5 4 7; 1 6 2] $[S_i]$ 4×1= [5, 8, 7, 15] $[D_j]$ 1×3= [7, 9, 18]
Problem 9 $[C_{ij}]$ 5×5= [8 8 2 10 2; 11 4 10 9 4; 5 2 2 11 10; 10 6 6 5 2; 8 11 8 6 4] $[S_i]$ 5×1= [40, 70, 35, 90, 85] $[D_j]$ 1×5= [80, 55, 60, 80, 45]	**Problem 9** $[C_{ij}]$ 4×6 = [9, 12, 9, 6, 9, 10; 7, 3, 7, 7, 5, 5;6, 4, 9, 11, 3, 11;6, 8, 11, 2, 2, 10] $[S_i]$ 4×1= [5, 6, 2, 2] $[D_j]$ 1×6= [4, 4, 6, 2, 4, 2]
Problem 10 $[C_{ij}]$ 5×6= [5, 3, 7, 3, 8, 5;5, 6, 11, 5, 7, 12;2, 7, 3, 4, 8, 2;9, 7, 10, 5, 10, 9; 5, 3, 7,3, 7, 5] $[S_i]$ 5×1= [30, 40, 20, 40, 30] $[D_j]$ 1×6= [10, 40, 40, 20, 10, 40]	**Problem 10** $[C_{ij}]$ 5×4 = [60 120 75 180; 58 100 60 165; 62 110 65 170; 65 115 80 175; 70 135 85 195] $[S_i]$ 5×1= [8000, 9200, 6250, 4900, 6100] $[D_j]$ 1×4= [5000, 2000, 10000, 6000]
Problem 11 $[C_{ij}]$ 6×6= [5 1 2 3 4 7; 7 2 3 1 5 6; 9 1 9 5 2 3; 6 5 8 4 1 4; 8 7 11 6 4 5; 2 5 7 5 2 1] $[S_i]$ 6×1= [400, 500, 300, 150, 600, 350] $[D_j]$ 1×6= [300, 500, 700, 300, 250, 250]	--------

Result Analysis and Discussion:-

Each of the direct methods, discussed in Section 2, was tested on the challenging TPs listed in Table 6 and compared with their established optimal solutions shown in Table 7 and it is found that no one direct method had produced optimal solution directly to most of the TPs. Therefore, we conclude that every method proposed as direct is really not direct. The other methods, direct or not direct, not discussed in this paper can also make use of the listed challenging TPs to evaluate and assess their performance level.

Table 7:- Optimal Solutions of the Challenging TPs listed in Table 6.

BTP #	Optimal Solution	UTP #	Optimal Solution
1.	592	**1.**	1655
2.	2700	**2.**	1133
3.	410	**3.**	1515
4.	2965	**4.**	743
5.	316	**5.**	4720
6.	430	**6.**	17050
7.	8200	**7.**	193
8.	1102	**8.**	75
9.	1475	**9.**	71
10.	860	**10.**	2146750
11.	6400	**--**	--

Conclusion:-

In this article, we have studied and assessed the performance of the recently published 12 direct methods during the past one decade (2012 – 2021) to find the optimal solution directly for TPs. Each of the direct methods is tested on a set of 21 challenging TPs for which no one method has generated optimal solution directly to most of the problems. As a result, it is established and confirmed that each direct method is the one for finding an IBFS only and not a direct method for producing the optimal solution. Besides, for assessing the performance of any innovative method proposed on TPs in the future, the listed 21 challenging TPs may be trialed for testing and validating of the proposed novel method. It is the added benefit of this article. Moreover, so far no single direct method has been developed to derive the optimal solution directly to any given TP. The discussed direct methods published during the past one decade in various journals by different researchers are not consistent. By experimenting their methods only on very few simple problems they entitlement that their methods are direct. This boldness should change among the researchers in the field of TPs. The author(s) of a paper desires to get world recognition to their published works. Therefore, through this article, we request the researchers in this field to test their new algorithms not only on the simple problems, but also on the listed challenging TPs to develop and publis hhigh performance and high standard algorithms. In this regard, the roles of research scholars, their supervisors and reviewers of the papers from journals / conferences are also important. A great team (scholars, supervisors and reviewers) can make the difference between a good paper and a vow paper.

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