

A note on “A new heuristic for one warehouse and N retailers problem” by Ercan Senyigit and Hakan Akkan in *Procedia - Social and Behavioral Sciences*, 62, p. 656 – 660, 2012

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In Senyigit and Akkan (2012) a new heuristic to solve the one-warehouse and N-retailer problem is developed. In order to analyze the effectiveness of such a heuristic they compare it with the one proposed by Abdul-Jalbar et al. (2010). Concretely, they consider the same example that in Abdul-Jalbar et al. (2006) given in Table 1.

	Demand (d_j)	Setup cost (k_j)	Holding cost (h_j)
Warehouse	3176	40	11
Retailer 1	993	202	172
Retailer 2	304	283	43
Retailer 3	542	144	378
Retailer 4	859	408	498
Retailer 5	478	84	441

Table 1: Input data for an instance of the one-warehouse five-retailer problem

Senyigit and Akkan (2012) state that the total cost obtained using Roundy’s (1985) procedure and the heuristic proposed by Abdul-Jalbar et al (2010) are like the figures below:

Roundy (1985): 45837.5254

Abdul-Jalbar et al. (2010): 46173.1589

This woke our interest, we also calculated the total costs for both methods, but came to different results:

Roundy (1985): 44616.89

Abdul-Jalbar et al. (2010): 44609.66

The difference is considerable and clearly not just a typo. Therefore, we believe that the authors have not well implemented either the heuristic developed by Abdul-Jalbar et al. (2010) neither the Roundy’s (1985) method. The serious thing is that the authors use the method of Abdul-Jalbar et al. (2010) to compare with their suggested method, and conclude that their method is better. However, if Abdul-Jalbar et al.’s (2010) heuristic is not well implemented the computational results are wrong and the study is not reliable.

In addition, in the paper the authors also compare the solution provided by their new heuristic with the ones obtained using the methods proposed by Schwarz (1977), Graves and Schwarz (1977), Muckstadt and Roundy (1987) and Abdul-Jalbar et al. (2006). However, the authors never mention that the above procedures compute single-cycle policies while the approaches proposed by Roundy’s (1985), Abdul-Jalbar et al. (2010) and Senyigit and Akkan (2012)

calculate integer-ratio policies. Therefore, the comparison between the previous methods and the last ones does not make sense since single-cycle policies are a special case of integer ratio policies (single-cycle policies are always worse than integer-ratio ones).

Finally, it is also important to note that Senyigit and Akkan (2012) have not realized that in Abdul-Jalbar et al. (2006) h_j denotes “echelon holding cost at retailer j ” and in Senyigit and Akkan (2012) and in Abdul-Jalbar et al. (2010) h_j denotes “holding cost at retailer j ”. Therefore, since values h_j in Table 1 are used by Senyigit and Akkan (2012) as “holding costs” the cost of the single-cycle policy provided by Abdul-Jalbar et al. (2006) is not 46336.4603 but 45466.80.

Our solutions end up with the following frequencies (during a specific time interval):

Abdul-Jalbar et al. (2010): (1, 1, 1/5, 1, 1, 2)
Roundy (1985): (1, 1, 1/4, 1, 1, 2)
Abdul-Jalbar et al. (2006): (3, 1, 4, 3, 5)

References

- Abdul-Jalbar, B., Segerstedt, A., Joaquin, S., Nilsson, A. (2010). A new heuristic to solve one-warehouse N-retailer problem. *Computers & Operations Research*, 37 (2), 265-272.
- Abdul-Jalbar, B., Gutierrez, M., Sicilia J. (2006). Single cycle policies for the one-warehouse N-retailer inventory/distribution system. *Omega*, 34 (2), 196-208.
- Muckstadt, J. A. and Roundy, R. O. (1987). Multi-item, one-warehouse, multi-retailer distribution systems. *Management Science*, 33 (12), 1613-1621.
- Roundy, R O. (1985). 98% Effective integer-ratio lot sizing for one-warehouse multiretailer systems. *Management Science*, 31 (11), 1416–1430.
- Schwarz, L. B. (1977). A Simple Continuous Review Deterministic One-Warehouse N-Retailer Inventory Problem. *Management Science*, 19 (5), 555-566.
- Graves, S. C. and Schwarz, L. B. (1977). Single Cycle Continuous Review Policies for Arborescent Production/ Inventory Systems. *Management Science*, 23 (5), 529-540