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APPLYING SIGNED DISTANCE METHOD FOR FUZZY INVENTORY WITHOUT BACKORDER

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Abstract. *For the total cost of the inventory without backorder model, if we fuzzify the order quantity, the total demand, the cost of storing and the cost of placing an order as fuzzy numbers then we can obtain the fuzzy total cost. In this paper, we apply the signed distance method to defuzzify the fuzzy total cost and then solve the optimal order quantity.*
Keywords: Fuzzy total cost, Signed distance

1. **Introduction.** There are several papers to treat the fuzzified problems of EOQ model. Vujosevic *et al.* [14] used trapezoidal fuzzy number to fuzzify the order cost in the total cost of the inventory model with backorder. Then, they got fuzzy total cost. They obtained the estimate of the total cost through centroid to defuzzify. Chen and Wang [3] used trapezoidal fuzzy number to fuzzify the order cost, inventory cost and backorder cost in the total cost of the inventory model without backorder. Then, they found the estimate of the total cost in the fuzzy sense by functional principle. Roy and Maiti [13] used nonlinear programming method to rewrite the classical economic order quantity problem. They fuzzified the objective function and storage area and solved this problem by fuzzy nonlinear and geometric programming. Ishii and Konno [6] fuzzified the shortage cost to L fuzzy numbers in the classical newsboy problem and got optimal ordering quantity by fuzzy ordering concept. In a series of papers, Yao *et al.* [2,4,9,15-18], considered the fuzzified problems for the inventory with or without backorder models. In [9,15,17], they considered the fuzzified problems for the inventory without backorder models. In [9], they fuzzified the order quantity q as the triangular fuzzy number, in [17], they fuzzified the order quantity q as the trapezoidal fuzzy number, and in [15], they fuzzified the order quantity q and the total demand quantity r as the triangular fuzzy numbers. In [9,15,17], they applied the extension principle to obtain the fuzzy total cost, and then, they defuzzified the fuzzy total cost by centroid. In [8], Lee and Chiang fuzzified the quantity produced per cycle, the holding cost, production cost, production quantity per day, the total demand quantity and the demand quantity per day, to triangular fuzzy numbers; and found the total costs in the fuzzy sense by signed distance and got the optimal solutions. In [2,4,16,17,18], they considered the fuzzified problems for the inventory with backorder models. In [2], they fuzzified the maximal stock quantity s as the triangular fuzzy number