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FUZZY ECONOMIC PRODUCTION QUANTITY MODEL FOR ITEMS WITH IMPERFECT QUALITY

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Abstract. *In the real world, vague phenomenon is quite common in the production/inventory models. In order to process the vagueness, a production/inventory model that can be more closely related to the real vagueness and can take account of the vague factors that contribute to production costs, is required. The model must be extended or altered to fit in with the fuzzy situation. Since items with imperfect quality, during production or inventory procedure, are unavoidable, we also consider this situation. In order to treat the case in the vague environment, we propose a Fuzzy Economic Production Quantity (FEPQ) model with imperfect products that can be sold at a discount price. In this model, costs and quantities are expressed as trapezoidal fuzzy numbers. Moreover, we use Function Principle to manipulate arithmetical operations, Graded Mean Integration Representation method to defuzzify, and Kuhn-Tucker conditions to find the optimal economic production quantity of the fuzzy production inventory model. Finally, an application of an electronics industry example gives a satisfactory result.*

Keywords: Fuzzy inventory model, Economic production quantity, Function principle, Graded mean integration representation method, Optimization, Imperfect production, Defective products

1. **Introduction.** Fuzzy set concept has been widely used to treat the classical inventory model. Park [31] considered fuzzy inventory cost in the economic order quantity model. Chang [3] discussed how to get the economic order quantity, when the quantity of demand is uncertain. Hsieh [17], Lee et al. [23], Lin et al. [25] also wrote some articles about fuzzy production model, but all of them have not developed an inventory model with imperfect products.