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A possibilistic multiple objective pricing and lot-sizing model with multiple demand classes.

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Summary: We address an inventory-marketing system to determine the production lot size, marketing expenditure and selling prices where a firm faces demand from two or more market segments in which the firm can set different prices. Considering pricing, marketing and lot-sizing decisions simultaneously, the model maximizes the profit and return on inventory investment under multiple time varying demand classes. The model is formulated as a fuzzy non-linear multi-objective one where some parameters are ill-known and modeled by fuzzy numbers. A hybrid possibilistic-flexible programming approach is proposed to handle imprecise data and soft constraints concurrently. After transforming the original model into an equivalent multi-objective crisp model, it is then converted to a classical mono-objective one by a fuzzy goal programming method. An efficient solution procedure using particle swarm optimization (PSO) is also provided to solve the resulting nonlinear problem.

MSC:

91B38 Production theory, theory of the firm
90B05 Inventory, storage, reservoirs
90C29 Multi-objective and goal programming
90C70 Fuzzy and other nonstochastic uncertainty mathematical programming

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Keywords:

fuzzy mathematical programming; lot-sizing; market segmentation; price differentiation; fuzzy sets

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