

Lu, Shan; Su, Hongye; Xiao, Lian; Zhu, Li

Application of two-phase fuzzy optimization approach to multiproduct multistage integrated production planning with linguistic preference under uncertainty. (English) [Zbl 1394.90251](#)
Math. Probl. Eng. 2015, Article ID 780830, 20 p. (2015).

Summary: This paper tackles the challenges for a production planning problem with linguistic preference on the objectives in an uncertain multiproduct multistage manufacturing environment. The uncertain sources are modelled by fuzzy sets and involve those induced by both the epistemic factors of process and external factors from customers and suppliers. A fuzzy multiobjective mixed integer programming model with different objective priorities is proposed to address the problem which attempts to simultaneously minimize the relevant operations cost and maximize the average safety stock holding level and the average service level. The epistemic and external uncertainty is simultaneously considered and formulated as flexible constraints. By defining the priority levels, a two-phase fuzzy optimization approach is used to manage the preference extent and convert the original model into an auxiliary crisp one. Then a novel interactive solution approach is proposed to solve this problem. An industrial case originating from a steel rolling plant is applied to implement the proposed approach. The numerical results demonstrate the efficiency and feasibility to handle the linguistic preference and provide a compromised solution in an uncertain environment.

MSC:

90B30 Production models

90C70 Fuzzy and other nonstochastic uncertainty mathematical programming

Full Text: [DOI](#)

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