

模糊環境下之產能批量問題

孫正民、白炳豐

E-mail: 9126821@mail.dyu.edu.tw

摘要

於傳統的產能批量問題(Capacitated Lot Sized Problem, CLSP)中,產能假設為已知。然而,在實際上產能多為未知或尚未確定;尤其當計劃的時間延長時,產能預測將包含更多的不確定因素。在多數的情形下,歷史資料及其機率分配將用於產能的評估,但歷史資料往往不易取得且其機率分配難以推估,而此種產能推估,若由決策者主觀的經驗判斷並透過模糊函數來表達產能將更實用且自然。這種表達法之主要優點為決策者在決定產能時不需只給單一值或是機率分配。本研究應用模糊集合理論於產能批量問題,以Florian和Klein[14]求解最佳產能之方法為主體,並加以修改,以使其可以處理模糊產能;最後應用模糊等級比較法求出一最佳生產計劃。

關鍵詞: 產能批量問題, 模糊集合理論

目錄

第一章緒論--P1 1.1 研究背景--P1 1.2 研究目的--P2 1.3 研究方法與範圍--P2 1.4 論文章節概要--P4 第二章文獻探討--P5 2.1 產能的定義與分類--P5 2.2 產能規劃的重要性--P6 2.3 產能批量問題--P6 2.4 F&K法--P7 2.5 各文獻研究之探討--P8 第三章模糊產能批量問題--P14 3.1 符號說明--P14 3.2 模糊產能下之F&K法--P15 3.3 模糊等級比較法--P16 3.4 求解生產計劃步驟--P18 3.5 數值範例(一)--P24 3.5.1 計算所有節點組合--P25 3.5.2 局部模糊生產計劃--P25 3.5.3 計算模糊生產總成本--P34 第四章模糊環境下之產能批量問題--P38 4.1 符號說明--P38 4.2 模糊環境下之F&K法--P38 4.3 求解生產計劃步驟--P39 4.4 數值範例(二)--P40 4.4.1 計算模糊生產總成本--P40 第五章結果分析與討論--P47 5.1 F&K法、模糊F&K法之結果比較--P47 5.2 模糊結果的使用與解釋--P48 第六章結論--P51 參考文獻--P52 附錄(一)--P56 附錄(二)--P81

參考文獻

1. WILLIAM J. STEVENSON 著, 傅和彥譯, 生產管理第六版, 前程企業管理有限公司, 民國88年。
2. 張百棧, 生產管理, 華泰書局, 民國85年。
3. 楊必立、劉水深, 生產管理辭典, 華泰書局, 民國77年。
4. 楊君威, 利用離散事件模擬方法求解即時性產能規劃問題-以半導體封裝場封膠區為例, 國立成功大學製造工程研究所, 碩士論文, 民國90年。
5. 賴士葆, 生產作業管理理論與實務, 華泰書局, 民國84年。
6. BITRAN AND YANASSE, "COMPUTATIONAL COMPLEXITY OF THE CAPACITATED LOT SIZE PROBLEM," MANAGEMENT SCIENCE, VOL. 28, NO. 10, 1982, PP.1174-1186.
7. CALLARMAN, THOMAS E. AND ROBERT S. HAMRIN, "A COMPARISON OF DYNAMIC LOT SIZING RULES FOR USE IN A SINGLE STAGE MRP SYSTEM WITH DEMAND UNCERTAINTY," INTERNATIONAL JOURNAL OF OPERATIONS AND PRODUCTION MANAGEMENT, 1983, PP.39-48.
8. CHANG, P.-T. AND E.S. LEE, "RANKING OF FUZZY SETS BASED ON THE CONCEPT OF EXISTENCE," COMPUTERS MATH. APPLIC, VOL. 27, NO. 9/10, 1994, PP.1-21.
9. CHEN, LIANG-HSUAN AND HAI-WEN LU, "AN APPROXIMATE APPROACH FOR RANKING FUZZY NUMBERS BASED ON LEFT AND RIGHT DOMINANCE," COMPUTER AND MATHEMATICS WITH APPLICATIONS, VOL. 41, 2001, PP.1589-1602.
10. CHENG, C.H., "SOLVING THE CAPACITATED LOT-SIZING PROBLEM WITH BACKORDER CONSIDERATION," THE JOURNAL OF THE OPERATIONAL RESEARCH SOCIETY; OXFORD; AUG, VOL. 52, 2001, PP.952-959.
11. CHUNG, CHIA-SHIN, JAMES FLYNN, AND CHIEN-HUA MIKE LIN, "AN EFFECTIVE ALGORITHM FOR THE CAPACITATED SINGLE ITEM LOT SIZE PROBLEM," EUROPEAN JOURNAL OF OPERATIONAL RESEARCH, VOL. 75, 1994, PP.427-440.
12. DELLAERT, N.P. AND M.T. MELO, "PRODUCTION STRATEGIES FOR A STOCHASTIC LOT-SIZING PROBLEM WITH CONSTANT CAPACITY," EUROPEAN JOURNAL OF OPERATIONAL RESEARCH, AMSTERDAM; JUL 19, VOL. 92, 1996, PP.281-301.
13. DOBRILA PETROVIC AND EDWARD SWEENEY, "FUZZY KNOWLEDGE-BASED APPROACH TO TREATING UNCERTAINTY IN INVENTORY CONTROL," COMPUTER INTEGRATED MANUFACTURING SYSTEMS, VOL. 7, NUMBER 3, 1994, PP.147-152.
14. FLORIAN, M. AND M. KLEIN, "DETERMINISTIC PRODUCTION PLANNING WITH CONCAVE COST AND CAPACITY CONSTRAINT," MANAGEMENT SCIENCE, VOL. 18, NO. 1, 1971, PP.12-20.
15. LEE, Y.Y., B.A. KRAMER AND C.L. HWANG, "A COMPARATIVE STUDY OF THREE LOT-SIZING METHODS FOR THE CASE OF FUZZY DEMAND," INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT, VOL. 11, NO. 7, 1991, PP.72-80.
16. LEE, Y.Y., B.A. KRAMER AND C.L. HWANG, "PART-PERIOD BALANCING WITH UNCERTAINTY: A FUZZY SETS THEORY APPROACH," INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT, VOL. 28, NO. 10, 1990, PP.1771-1778.
17. LEE,

HUEY-MING, AND JING-SHING YAO, "ECONOMIC PRODUCTION QUANTITY FOR FUZZY DEMAND QUANTITY AND FUZZY PRODUCTION QUANTITY," EUROPEAN JOURNAL OF OPERATIONAL RESEARCH VOL. 109, 1998, PP.203-211. 18. MCCAHERN, CYNTHIA S. AND E. STANLEY LEE, "FUZZY JOB SEQUENCING FOR A FLOW SHOP," EUROPEAN JOURNAL OF OPERATIONAL RESEARCH, VOL.62, 1992, PP.294-301. 19. PAPPIS, C.P. AND N.I. KARACAPILIDIS, "LOT SIZE SCHEDULING USING FUZZY NUMBERS," INTERNATIONAL TRANSACTIONS IN OPERATIONAL RESEARCH, VOL. 2, NO. 2, 1995, PP.205-212. 20. ROY, T.K. AND M.MAITI, "A FUZZY EOQ MODEL WITH DEMAND-DEPENDENT UNIT COST UNDER LIMITED STORAGE CAPACITY," EUROPEAN JOURNAL OF OPERATIONAL RESEARCH, VOL. 99, 1997, PP.425-432. 21. SHAW, DONG X. AND ALBERT P.M. WAGELMANS, "AN ALGORITHM FOR SINGLE-ITEM CAPACITATED ECONOMIC LOT SIZING WITH PIECEWISE LINEAR PRODUCTION COSTS AND GENERAL HOLDING COSTS," MANAGEMENT SCIENCE, VOL. 44, NO.6, 1998, PP.831-838. 22. VUJOSEVIC, MIRKO, DOBRILA PETROVIC AND RADIVOJ PETROVIC, "EOQ FORMULA WHEN INVENTORY COST IS FUZZY," INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS, VOL. 45, 1996, PP.499-504. 23. WANGER, H. M., "A POSTSCRIPT TO DYNAMIC PROBLEMS OF THE FIRM," NAVAL RESEARCH LOGISTICS QUARTERLY, VOL. 7, 1960, PP. 7-12. 24. WANGER, H. M. AND WHITIN, T. M., "DYNAMIC VERSION OF THE ECONOMIC LOT SIZE MODEL," MANAGEMENT SCIENCE, VOL. 5, 1958, PP. 89-96. 25. WHYBARK, D. CLAY AND J. GREGG WILLIAMS, BELL HELICOPTER COMPANY, "MATERIAL REQUIREMENTS PLANNING UNDER UNCERTAINTY," DECISION SCIENCES, VOL. 7, 1976, PP.505-606. 26. ZADEH, L.A., "FUZZY SETS AS A BASIS FOR A THEORY OF POSSIBILITY," FUZZY SETS AND SYSTEMS, VOL. 1, 1978, PP.3-28. 27. ZADEH, L.A., "FUZZY SETS," INFORMATION AND CONTROL, VOL. 8, 1965, PP.338-353. 28. ZANGWILL, W. I., "A DETERMINISTIC MULTI-PERIOD PRODUCTION SCHEDULING MODEL WITH BACKLOGGING," MANAGEMENT SCIENCE, VOL. 13, 1966, PP. 105-119.