

蟻群演算法於非等效平行機台之多階段流程型排成問題研究

林熙凱、駱景堯

E-mail: 9423578@mail.dyu.edu.tw

摘要

本研究乃針對非等效平行機台之多階段流程型排程問題，以總流程時間最小化為目標進行探討，其與傳統流程型排程問題不同處在於所考量各階段之平行機台有著不同的加工效率、可分割的整備時間(sequence independent setup time)及排序相依的拆卸時間(sequence dependent removal time)。研究中建構以蟻群演算法為基之兩種啟發式演算法架構。隨及將此二種演算法架構與模擬退火法在各種不同排程環境下進行執行結果分析與比較。實驗結果顯示，本研究所發展之啟發式演算法二配合適當的螞蟻數及殘留係數，不管在求解品質與求解時間方面，皆有不錯之效果。

關鍵詞：蟻群演算法；非等效平行機台；相依拆卸時間；獨立整備時間

目錄

目錄封面內頁 簽名頁 授權書.....	iii	中文摘要.....	iv
ABSTRACT.....	v	誌謝.....	vi
目錄.....	vii	圖目錄.....	ix
表目錄.....	x	第一章 緒論 1.1 研究動機與背景.....	1
1.2 研究目標.....	2	1.3 問題描述與假設.....	2
1.4 研究方法與架構.....	4	第二章 文獻探討.....	6
2.1 整備時間、拆卸時間.....	6	2.2 平行機台.....	7
2.3 考量整備時間、拆卸時間之排程文獻探討.....	8	2.4 流程式平行機台之相關文獻探討.....	9
2.5 蟻群演算法.....	11	第三章 蟻群演算法之建構.....	17
3.1 機器、工件與階段的轉換關係.....	17	3.2 符號定義.....	18
3.3 蟻群演算法一之演算步驟.....	20	3.4 蟻群演算法二之演算步驟.....	23
第四章 實驗設計與結果分析.....	34	4.1 實驗?數設定.....	34
4.2 蟻群演算法?數分析.....	36	4.3 蟻群演算法與模擬退火法之結果比較分析.....	54
第五章 結論與建議.....	57	5.1 結論.....	57
5.2 建議.....	58	參考文獻.....	59
附錄 63			

參考文獻

- [1] 楊文華，「考慮設置時間下之相關排程問題研究」國立台灣工業技術學院，管理技術研究所博士論文，民國85年。
- [2] 洪正鴻，「非等效平行機台之多階段流程型排程求解模式建構」大葉大學碩士學位論文，民國91年。
- [3] 張百棧，「多階段不等效平行機台之排程研究」，工業工程學刊，19(2),79-95(2002)。
- [4] 蔡碧芳，「等效平行機台考量之多階段流程型排程問題探討」大葉大學碩士學位論文，民國91年。
- [5] 田國興，「有設置時間之流程型工廠多階段平行機台總排程時間最小化問題」中原大學碩士學位論文，民國88年。
- [6] Allahverdi, Ali., " Minimizing mean Flowtime in a two-machine Fowshop with Sequence-independent setup times " ,Computers and Operations Research,27,111-127(2000).
- [7] Allahverdi, Ali., and Aldowaisan, Tariq., " No-wait and separate setup three-machine Flowshop with total completiontime Criterion " ,International Trnscations in Opeartional Research,7,245-264(2000).
- [8] Allahverdi, Ali., and Aldowaisan, Tariq., " No-wait and separate setup three-machine Flowshop with total completion time Criterion " ,International Trnscations in Opeartional Research,7,pp245-264(2000).
- [9] Adamopoulos, George.I., and Pappis, Costas.p., " Scheduling Under a common due-date on parallel unrelated machines " ,European Journal of Operational Research,105,pp494-501(1998).
- [10] Brah, Shaukat.A., Loo, Luan.Luan., " Heuristics for scheduling in a flow shop with multiple processors " , European Journal of Operational Research,113, pp113-122(1999).
- [11] Cheng, T.G.J., " Scheduling Two Classes on Parallel Machines " , IIE Transactions, Vol. 27, 689-693(1995).
- [12] Dessouky.Maged M.and Dessouky Mohamed I., " Flow shop scheduling with identical jobs and uniform parallel machines " ,European Journal of Operational Research,109,pp620-631(1998).

- [13] Dorigo, M., and Gambardella, L.M., " Ant colonies for the traveling salesman problem. *BioSystems*, " Vol. 43, 73-81,(1997).
- [14] Franca,P.M.,Gendreau,M.,Laporte,G.,and Muller,F.M., "A Composite heuristic for identical parallel machine scheduling problem with minimum makespan objective " ,*Computers and Operations Research*, Vol.21, pp205-210 (1994).
- [15] Gilmore, P.C., and Gomory, R.E., " sequencing a one-statevvar iable machine; a solvable case of the traveling salesmanproblem, " *Opeartional Research*,12,655-679(1964).
- [16] Guinet,A., " Scheduling independent jobs uniform parallel Machines to minimize tardiness criteria " *Journal of Intelligent ,Manufacturing*, Vol.6, No2, pp95-103,1995 [17] Hariri, A,M,A., and Potts, C.N., " Heuristics for scheduling Unrelated parallel machines " *Computers and Operations Research*, Vol.18, pp323-331(1994).
- [18] Koulamas, Christos., Kyparisis,George J., " Scheduling on uniform parallel machines to minimize maxi- mum lateness " ,*Operations ResearchLetters*,Vol.26,pp175-179(2000) [19] Lee, Y.H., Bhaskaran, K., and Pinedo, M., " A heuristic tominimize the total weighted tardiness with sequence dependent setups " ,*IIE Transactions*, 29, 45-52(1997).
- [20] Proust, C., Gupta, J.N.D., and Deschamps, V., " Flowshop scheduling with set-up, processing and removal times separated, " *International Journal of Production Research*, 29, 479-493 (1991).
- [21] Sule, D.R., and Huang, K.Y., " Sequency on two and threemachines with setup, processing and removal times separated, " *International Journal of Production Research*, 21, 723-732 (1983).
- [22] Sule, D.R., " Sequencing n jobs on two machines with setup, processing and removal times separated, " *Naval Research Logistics Quarterly*, 29, 517-519 (1982).
- [23] Santos, D.L., Hunsucker, J.L., Deal,D.E., " Global lower bounds for flow shop with multiple processors " ,*EuropeanJournal of Operational Research*,80, pp112-120(1995).
- [24] Suresh, V., and Chaudhuri, Dipak., " Bicriteria scheduling problem for unrelated parallel machines " ,*Computers and Operations Research*,Vol.30,No.1,pp77-82(1996).
- [25] Yoshida, T., and Hitomi, K., " Optimal two-stage production scheduling with setup times separated, " *AIIIE Transactions*, 11, 261-263 (1979).