Author’s Accepted Manuscript

An improved migrating birds optimization for an integrated lot-streaming flow shop scheduling problem

Tao Meng, Quan-Ke Pan, Jun-Qing Li, Hong-Yan Sang

PII: S2210-6502(16)30496-5
DOI: http://dx.doi.org/10.1016/j.swevo.2017.06.003
Reference: SWEVO284

To appear in: Swarm and Evolutionary Computation

Received date: 5 December 2016
Revised date: 10 May 2017
Accepted date: 22 June 2017

Cite this article as: Tao Meng, Quan-Ke Pan, Jun-Qing Li and Hong-Yan Sang, An improved migrating birds optimization for an integrated lot-streaming flow shop scheduling problem, Swarm and Evolutionary Computation, http://dx.doi.org/10.1016/j.swevo.2017.06.003

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.
An improved migrating birds optimization for an integrated lot-streaming flow shop scheduling problem

Tao Meng\textsuperscript{ab}, Quan-Ke Pan\textsuperscript{c\ast}, Jun-Qing Li\textsuperscript{c}, Hong-Yan Sang\textsuperscript{c}

\textsuperscript{a}School of Mechatronic Engineering and Automation, Shanghai University, Shanghai 200072, P.R.China
\textsuperscript{b}College of Mathematic Science, Liaocheng University, Liaocheng 252059, P.R.China
\textsuperscript{c}School of Computer Science, Liaocheng University, Liaocheng 252059, P.R.China

\textbf{Abstract:} Lot-streaming is an effective technology to enhance the production efficiency by splitting a job or a lot into several sublots. It is commonly assumed that lot-splitting (i.e. job-splitting) is specified in advance and fixed during the optimization procedure in recent studies on lot-streaming flow shop scheduling problems. In many real-world production processes, however, it is not easy to determine the optimal lot-splitting beforehand. Therefore, in this paper we consider an integrated lot-streaming flow shop scheduling problem in which lot-splitting and job scheduling are needed to be optimized simultaneously. We provide a mathematical model for the problem and present an improved migrating birds optimization (IMMO) to minimize the maximum completion time or makespan. In the IMMO algorithm, a harmony search based scheme is designed to construct neighborhood of solutions, which makes good use of optimization information from the population and can tune the search scope adaptively. Moreover, a leaping mechanism is introduced to avoid being trapped in the local optimum. Extensive numerical simulations are conducted and comparisons with other state-of-the-art algorithms verify the effectiveness of the proposed IMMO algorithm.

\textbf{Keywords:} Migrating birds optimization; Meta-heuristics; Lot-streaming; Flow shop; Harmony search

\section{1. Introduction}

The flow shop scheduling problem is one of the most popular combinatorial optimization problems, which has strong engineering backgrounds and has been extensively applied to formulate various practical issues \cite{1}. For the classical flow shop scheduling problem, \( n \) jobs are processed on \( m \) machines with the same sequence and a job cannot be delivered to the downstream before the whole processing on it is finished. However, in many real cases such as in the manufacture of textile, plastic, chemical, semiconductor and so on, a job consists of numerous identical items and there is no need to transfer this job to the next machine until all items it contains are completed \cite{2}. Thus, lot-streaming technique is introduced. The lot-streaming flow shop scheduling problem (LSFSP) is an extension to the conventional flow shop scheduling problem, in which a job can be split into a number of smaller sublots and a single sublot can be moved to the next machine as soon as the operation on it is completed. By job-splitting (also called lot-splitting) and operation overlapping between successive machines, the idle time can be reduced \cite{3}. In recent years, LSFSPs have gained widespread attention and extensive studies have shown that lot-streaming can significantly improve the scheduling.

\textsuperscript{\ast} Corresponding author.

\textit{E-mail address:} 405754533@qq.com (Q.K.Pan)
دریافت فوری
متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات