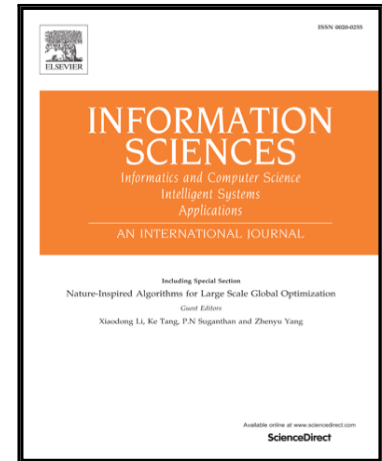


Accepted Manuscript

Petri Net Representation and Reachability Analysis of 0-1 Integer Linear Programming Problems

Akito Kodama, Tatsushi Nishi

PII: S0020-0255(17)30593-5
DOI: [10.1016/j.ins.2017.03.014](https://doi.org/10.1016/j.ins.2017.03.014)
Reference: INS 12795



To appear in: *Information Sciences*

Received date: 13 November 2015
Revised date: 6 March 2017
Accepted date: 10 March 2017

Please cite this article as: Akito Kodama, Tatsushi Nishi, Petri Net Representation and Reachability Analysis of 0-1 Integer Linear Programming Problems, *Information Sciences* (2017), doi: [10.1016/j.ins.2017.03.014](https://doi.org/10.1016/j.ins.2017.03.014)

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 proof before it is published in its final 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.

Petri Net Representation and Reachability Analysis of 0-1 Integer Linear Programming Problems

Akito Kodama^a, Tatsushi Nishi^a

*^aDivision of Mathematical Science for Social Systems, Department of Systems
Innovation, Graduate School of Engineering Science, Osaka University, 1-3
Machikaneyama, Toyonaka city, Osaka 560-8531, Japan*

Abstract

In this paper, we investigate a general algorithm for converting **the** 0-1 integer linear programming problem (0-1IP) into an optimal transition firing sequence problem (OFSP) of a Petri net (PN). The general 0-1IP can be visualized graphically and then analyzed using the PN theory after application of our proposed conversion algorithm. The proposed algorithm is applied to a traveling salesman problem, a vehicle routing problem and an automated guided vehicles (AGV) routing problem. A PN reduction technique is employed to reduce the size of the PN. Valid inequalities are derived using reachability analysis of the converted PN model. These inequalities are imposed on the original 0-1IP. Computational results show that the total **computational** time for solving an AGVRP with the valid inequalities derived using the reachability analysis is significantly reduced.

Key words: discrete event systems, Petri net, 0-1 integer linear programming problem, optimal transition firing sequence problems, reachability analysis, AGV systems

Download English Version:

<https://daneshyari.com/en/article/4944458>

Download Persian Version:

<https://daneshyari.com/article/4944458>

[Daneshyari.com](https://daneshyari.com)