

Accepted Manuscript

Inexact feasibility pump for mixed integer nonlinear programming

M. Li, Q. Liu

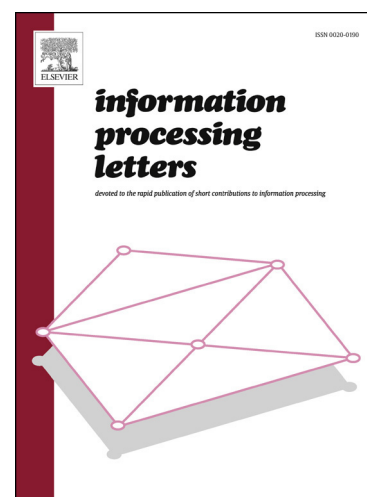
PII: S0020-0190(16)30150-8
DOI: <http://dx.doi.org/10.1016/j.ipl.2016.10.009>
Reference: IPL 5479

To appear in: *Information Processing Letters*

Received date: 16 December 2015
Revised date: 15 September 2016
Accepted date: 27 October 2016

Please cite this article in press as: M. Li, Q. Liu, Inexact feasibility pump for mixed integer nonlinear programming, *Inf. Process. Lett.* (2017), <http://dx.doi.org/10.1016/j.ipl.2016.10.009>

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.



Inexact Feasibility Pump for Mixed Integer Nonlinear Programming

M. Li * Q. Liu[†]

October 31, 2016

Abstract

The mixed integer nonlinear programming (MINLP) problem as an optimization problem involves both continuous and discrete variables. Moreover, at least one of the functions defining the objective function or the constraints must be nonlinear. Because of its complexity, it is very difficult to obtain the exact optimal solution. Therefore, the heuristic methods for getting a feasible solution of MINLPs are very important in practice. The feasibility pump is one of the famous heuristic methods, which alternates between solving nonlinear programming (NLP) problems and mixed integer linear programming (MILP) relaxed master problems.

In this paper, we will extend the feasibility pump to the case where the NLP problems are solved inexactly and propose the convergence of this method under some conditions. Moreover, we present the study of inexactness of the Lagrange multipliers (which are returned negative) of the NLP subproblems.

Keywords: Mixed integer nonlinear programming, feasibility pump, Lagrange multipliers, inexactness, heuristic

1 Introduction

The mixed integer nonlinear programming (MINLP) problem is an optimization problem with both continuous and discrete variables. Moreover, at least one of the functions defining the objective function or the constraints must be nonlinear. We denote the MINLP problems in the following form:

$$(\text{MINLP}) \begin{cases} \min & F(x, y) \\ \text{s.t.} & G(x, y) \leq 0, \\ & x \in X \cap \mathbb{Z}^{n_1}, y \in Y, \end{cases}$$

*School of Mathematical Sciences, Shandong Normal University, Ji'nan, China (liminEmily@sdu.edu.cn). Support for this author was provided by the Project Sponsored by the Scientific Research Foundation for the Returned Overseas Chinese Scholars, State Education Ministry, and Shandong Provincial Natural Science Foundation, China (Grant No. ZR2014J L001).

[†]School of Mathematical Sciences, Shandong Normal University, Ji'nan, China (lq_qsh@163.com).

Download English Version:

<https://daneshyari.com/en/article/4950930>

Download Persian Version:

<https://daneshyari.com/article/4950930>

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