

Accepted Manuscript

A Radial Boundary Intersection aided Interior Point Method for
Multi-objective Optimization

Shounak Datta, Abhiroop Ghosh, Krishnendu Sanyal, Swagatam Das

PII: S0020-0255(16)31127-6
DOI: [10.1016/j.ins.2016.09.062](https://doi.org/10.1016/j.ins.2016.09.062)
Reference: INS 12558



To appear in: *Information Sciences*

Received date: 2 January 2016
Revised date: 28 September 2016
Accepted date: 30 September 2016

Please cite this article as: Shounak Datta, Abhiroop Ghosh, Krishnendu Sanyal, Swagatam Das, A Radial Boundary Intersection aided Interior Point Method for Multi-objective Optimization, *Information Sciences* (2016), doi: [10.1016/j.ins.2016.09.062](https://doi.org/10.1016/j.ins.2016.09.062)

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.

A Radial Boundary Intersection aided Interior Point Method for Multi-objective Optimization

Shounak Datta^a, Abhiroop Ghosh^b, Krishnendu Sanyal^b, Swagatam Das^a

^aIndian Statistical Institute, Kolkata, India.

^bJadavpur University, Kolkata, India.

Abstract

We propose a novel multi-objective optimization technique combining non-convex Radial Boundary Intersection based decomposition with an Interior Point method (which utilizes both line search and trust region steps) suitable for non-convex nonlinear optimization. Radial Boundary Intersection decomposes the multi-objective optimization problem into subproblems which are concerned with finding the solutions closest to a reference point along equally spaced lines emanating radially outwards from the latter point. The proposed approach is found to be able to generate good approximations of the Pareto front (including the periphery) by generating a sufficiently diverse set of Pareto optimal solutions. The proposed method is extensively tested on a large number of recent benchmark problems and real world problems and the performance is found to be favourable in comparison to those of some of the cutting-edge stochastic/evolutionary optimization algorithms that are commonly used to solve non-convex multi-objective optimization problems.

Keywords: Multiple objective optimization, Boundary intersection, Interior point method, Line search, Trust region

1. Introduction

Practical problems involving decision-making often consist of mutually conflicting objectives which prevent any possibility of simultaneously optimizing all the objectives to their best values. Mathematically, a Multi-objective Optimization Problem (MOP) can be expressed as

$$\min_{\mathbf{x} \in \Omega} \mathbf{F}(\mathbf{x}) = \begin{bmatrix} f_1(\mathbf{x}) \\ f_2(\mathbf{x}) \\ \vdots \\ f_m(\mathbf{x}) \end{bmatrix}, \quad m \geq 2, \quad (1)$$

*Corresponding author: Swagatam Das
 Phone: 033-25752900
 Email Address: swagatam.das@isical.ac.in

Download English Version:

<https://daneshyari.com/en/article/4944828>

Download Persian Version:

<https://daneshyari.com/article/4944828>

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