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An algorithm for piece–wise indefinite quadratic programming problem

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Abstract. An indefinite quadratic programming problem is a mathematical programming problem which is a product of two linear factors. In this paper, the piece–wise indefinite quadratic programming problem (*PIQPP*) is considered. Here, the objective function is a product of two continuous piece–wise linear functions defined on a non-empty and compact feasible region. In the present paper, the optimality criterion is derived and explained in order to solve PIQPP. While solving PIQPP, we will come across certain variables which will not satisfy the optimality condition. For these variables, cases have been elaborated so as to move from one basic feasible solution to another till we reach the optimality. An algorithmic approach is proposed and discussed for the PIQPP problem. A numerical example is presented to decipher the tendered method.

Keywords: indefinite quadratic programming problem, optimal solution, piece–wise indefinite quadratic function, quasi–concave function

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1. Introduction

Quadratic programming is an important class of non-linear programming in which the objective function is quadratic and the constraints are linear. Aneja et al. [1] in their paper considered a class of quadratic programs. They considered the maximization and minimization cases of this program assuming the two linear factors to be non-negative. Cabot[3] in his paper considered the problem of maximizing the sum of certain quasi-concave functions over a convex set. Kough [10] developed an algorithm to obtain the global optimum of indefinite quadratic programming problem by employing Benders cut. Pardalos et al. [14] in their paper proposed branch and bound algorithm for finding the global optimum of large scale indefinite quadratic problems over a polytope. Chen and Huang [5] in 2001, proposed a derivative algorithm for solving the inexact quadratic programming which has been a useful tool for environmental system analysis. Shi et al. [15] in 2005 proposed a multiple criteria quadratic programming to classify credit card accounts for business intelligence and decision making.

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