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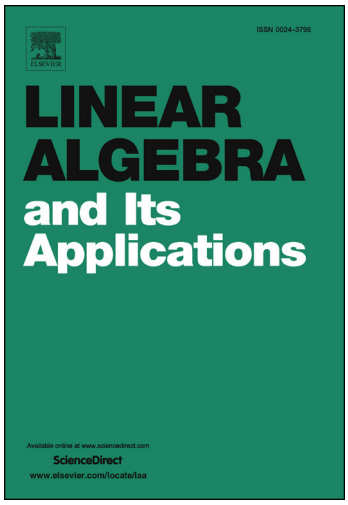

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Total Dual Integrality and Integral Solutions of the Linear Complementarity Problem

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Abstract

This paper deals with the problem of finding an integer solution to a linear complementarity problem (LCP). Chandrasekaran et al. [1] introduced the class **I** of integral matrices for which the corresponding LCP has an integer solution for every integral vector q, for which it has a solution and proved that for some well known matrix classes principal unimodularity forms a necessary and sufficient condition for inclusion in class **I**. In this paper, we identify some more well-known matrix classes for which principal unimodularity forms a necessary and sufficient condition for inclusion in class **I**. The concept of total dual integrality is utilized to obtain a necessary and sufficient condition for existence of an integer solution to LCP with a **hidden K**-matrix. We interconnect the concept of Hilbert basis with principal unimodularity of a matrix and the corresponding complementary cones. A necessary and sufficient condition is given for the existence of an integer solution of a linear fractional programming problem by using its LCP formulation.

Keywords: Linear complementarity problem, Integer solution, Total dual integrality, **Hidden Z**-matrix, Principal unimodularity, Matrix classes.
AMS Classification: 90C33

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