The Electronic Journal of Linear Algebra.
A publication of the International Linear Algebra Society.
Volume 8, pp. 140-157, December 2001.
ISSN 1081-3810. http://math.technion.ac.il/iic/ela

ELA

MINIMAL CP RANK*

NAOMI SHAKED-MONDERER†

Abstract. For every completely positive matrix A, cp-rank $A \geq$ rank A. Let cp-rank G be the maximal cp-rank of a CP matrix realization of G. Then for every graph G on n vertices, cp-rank $G \geq n$. In this paper the graphs G on n vertices for which equality holds in the last inequality, and graphs G such that cp-rank $A =$ rank A for every CP matrix realization A of G, are characterized.

Key words. Completely positive matrices, cp-rank, rank 1 representation.

AMS subject classifications. 15A23, 15F48

*Received by the editors on 4 November 2001. Accepted for publication on 21 November 2001. Handling Editor: Daniel Hershkowitz.

†Emek Yezreel College, Emek Yezreel 19300, Israel (nomi@techunix.technion.ac.il).