1035-15-119 **Jonathan E. Beagley*** (beagjon@iit.edu), 1394 Cottonwood Lane, Crystal Lake, IL 60014, **Eileen L. Radzwion** (radzw1el@cmich.edu), 810 S. University, Mt. Pleasant, MI 48858, and **Andrew M. Zimmer** (azimmer@ups.edu), 3601 WSC, Tacoma, WA 98416. *Minimum Semidefinite Rank of a Graph with Cut Sets of Size 2 and Graphs with msr(G) = |G| − 2.*

Given a Hermitian matrix $A \in M_n(\mathbb{C})$, associate a simple, undirected graph $G(A)$ where $V(G) = \{1, 2, \ldots, n\}$ and $E(G) = \{ij \mid a_{ij} \neq 0, i \neq j\}$. The collection of all Hermitian matrices that share a common graph G is denoted $\mathcal{H}(G)$. The problem of finding the multiplicities of the eigenvalues among the matrices in $\mathcal{H}(G)$ has received much attention recently. In this presentation we consider $\mathcal{P}(G) \subset \mathcal{H}(G)$ where $\mathcal{P}(G)$ is the set of all positive semidefinite matrices corresponding to G. The *minimum semidefinite rank* of G, denoted msr(G), is defined to be the minimum rank among all matrices in $\mathcal{P}(G)$.

To each vertex i in a graph G we associate a vector $\vec{v_i} \in \mathbb{C}^m$ such that for $i \neq j$, $ij \in E(G)$ if and only if $\langle \vec{v_i}, \vec{v_j} \rangle \neq 0$. The set of vectors $\{\vec{v_1}, \vec{v_2}, \ldots, \vec{v_n}\}$ is called a vector representation of G. Using vector representations we present results on finding the msr(G) when G is written as a "vertex sum" of two graphs G_1 and G_2 that share a cut set of at most two vertices. Lastly, a classification of all graphs with msr(G)= $|G| - 2$ will be discussed. (Received July 25, 2007)