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Richard S Varga* (varga@math.kent.edu) and **A Rizzo**. *An Application of Nonnegative Matrices to the Synchronization of Chaotic Oscillators.*

For any positive integer k , let $B = [b_{i,j}]$ in $R^{m,m}$, where $m \geq k + 1$, have entries satisfying

$$b_{i,i} = 0 \text{ (all } 1 \leq i \leq m); \tag{1}$$

$$b_{i,j} = 0 \text{ or } 1 \text{ (all } i \neq j, 1 \leq i, j \leq m); \tag{2}$$

$$\sum_{j=1}^m b_{i,j} = k \text{ (all } 1 \leq i \leq m); \tag{3}$$

and let $\mathfrak{B}(k)$ denote the set of all $m \times m$ matrices satisfying (1) – (3), with $m \geq k + 1$. We show here that

$$\overline{\bigcup_{B \in \mathfrak{B}(1)} \sigma(B)} = \{0\} \cup \{z \in C : |z| = 1\},$$

and

$$\overline{\bigcup_{B \in \mathfrak{B}(k)} \sigma(B)} = \{z \in C : |z| \leq k\}, \text{ for all } k \geq 2.$$

We also show graphically how the eigenvalues of $\mathfrak{B}(k)$ fill out the associated disk, for $k \geq 2$. (Received January 21, 2011)