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ELA

A REFINEMENT OF AN INEQUALITY OF JOHNSON, LOEWY AND LONDON ON NONNEGATIVE MATRICES AND SOME APPLICATIONS.*

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Dedicated to Hans Schneider on the occasion of his seventieth birthday.

Abstract. Let A be an entrywise nonnegative $n \times n$ matrix and let $s_k := \mathrm{trace}\,(A^k)$ $(k = 1, 2, \ldots)$. It is shown that if n is odd and $s_1 = 0$, then $(n-1)s_4 \geq s_2^2$. The result is applied to show that $(3, \frac{1}{2}(1 \pm \sqrt{17}), -2, -2)$ is not the spectrum of a nonnegative 5×5 matrix while $(3, \frac{1}{2}(1 \pm \sqrt{17}), -2, -2, 0)$ is the spectrum of a nonnegative symmetric 6×6 matrix.

Key words. nonnegative matrix, spectrum, eigenvalues, Johnson-Loewy-London inequalities, symmetric, triangular graph, copositive matrix.

AMS subject classifications. 15A48, 15A18, 05C50, 15A45

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