SEVERAL INEQUALITIES FOR THE LARGEST SINGULAR VALUE AND THE SPECTRAL RADIUS OF MATRICES

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Abstract. For nonnegative matrices $A = (a_{ij}) \in \mathbb{R}^{n \times m}$, $B = (b_{ij}) \in \mathbb{R}^{m \times n}$ and any $t \in [0, 1]$, we present $\sigma(S_t(A, B)) \leq \sigma(A)^t \sigma(B)^{1-t}$, in which $S_t(A, B) = (a_{ij}^t b_{ji}^{1-t})$ and $\sigma(\cdot)$ denotes the largest singular value. Using the result obtained, the inequality $\sigma(A \circ B) \leq \sqrt{\sigma(A \circ A) \sigma(B \circ B)}$ for matrices $A = (a_{ij})$ and $B = (b_{ij}) \in \mathbb{C}^{n \times m}$ is established. Here, $A \circ B = (a_{ij} \overline{b_{ij}})$, and $\overline{b_{ij}}$ denotes the complex conjugate of $b_{ij}$. Finally, some inequalities for the spectral radius are also studied.


Key words and phrases: nonnegative matrix; largest singular value; spectral radius; inequality.

REFERENCES