ON SOME CLASSICAL TRACE INEQUALITIES AND
A NEW HILBERT–SCHMIDT NORM INEQUALITY

MOSTAFA HAYAJNEH, SAJA HAYAJNEH AND FUAD KITTANEH

Abstract. Let $A$ be a positive semidefinite matrix and $B$ be a Hermitian matrix. Using some classical trace inequalities, we prove, among other inequalities, that

$$
\|A^tB + BA^{1-t}\|_2 \leq \|A^sB + BA^{1-s}\|_2
$$

for $\frac{1}{2} \leq s \leq t \leq 1$. We conjecture that this inequality is also true for all unitarily invariant norms, and we affirmatively settle this conjecture for the case $s = \frac{1}{2}$ and $t = 1$.


Keywords and phrases: Trace, Hilbert-Schmidt norm, positive semidefinite matrix, Hermitian matrix, inequality.

REFERENCES