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The Quaternion Matrix-Valued Young's Inequality

Authors: Renying Zeng,

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Abstract: In this paper, we prove Young's inequality in quaternion matrices: for any $n \times n$ quaternion matrices A and B, any $p,q \in (1,\infty)$ with

 $\frac{1}{p}+\frac{1}{q}=1,$ there exists $n\times n$ unitary quaternion matrix U such that

 $U|AB^*|U^* \le \frac{1}{p}|A|^p + \frac{1}{q}|B|^q.$

Furthermore, there exists unitary quaternion matrix U such that the equality holds if and only if $|B|=|A|^{p-1}$.

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