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# New Bounds for The Identric Mean of Two Arguments

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**Abstract:**

Given two positive real numbers $x$ and $y$, let $A(x,y)$, $G(x,y)$, and $I(x,y)$ denote their arithmetic mean, geometric mean, and identric mean, respectively. Also, let $K_p(x,y) = \sqrt[p]{\frac{2}{3}A^p(x,y) + \frac{1}{3}G^p(x,y)}$ for $p > 0$.

In this note we prove that $K_p(x,y) < I(x,y)$ for all positive real numbers $x \neq y$ if and only if $p \leq 6/5$, and that $I(x,y) < K_p(x,y)$ for all positive real numbers $x \neq y$ if and only if $p \geq (\ln 3 - \ln 2)/(1 - \ln 2)$. These results, complement and extend similar inequalities due to J. Sándor [2], J. Sándor and T. Trif [3], and H. Alzer and S.-L. Qiu [1].

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