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Note on Certain Inequalities for Means in Two Variables

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Abstract: Given the 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. It is proved that for $p \geq 2$, the double inequality

$$\alpha A^p(x, y) + (1 - \alpha)G^p(x, y) < I^p(x, y) < \beta A^p(x, y) + (1 - \beta)G^p(x, y)$$

holds true for all positive real numbers $x \neq y$ if and only if $\alpha \leq \left(\frac{2}{e}\right)^p$ and $\beta \geq \frac{2}{3}$. This result complements a similar one established by H. Alzer and S.-L.

Qiu [Inequalities for means in two variables, *Arch. Math. (Basel)* **80** (2003), 201-215].



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