

Title: Ratio of Stolarsky means: monotonicity and comparison

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The STOLARSKY mean $S_{a,b}(x, y)$ of the numbers $x, y > 0$ with parameters $a, b \in \mathbb{R}$ is defined by

$$S_{a,b}(x, y) = \frac{b(x^a - y^a)^{\frac{1}{a-b}}}{a(x^b - y^b)} \quad \text{if } ab(a-b)(x-y) \neq 0,$$

while for $ab(a-b)(x-y) = 0$ the function $S_{a,b}(x, y)$ is extended continuously. We study monotonicity properties of the ratio

$$R_{a,b}(x, y, z) := \frac{S_{a,b}(x, y)}{S_{a,b}(x, z)} \quad (a, b \in \mathbb{R}, 0 < x < y < z)$$

in the parameters a, b where $0 < x < y < z$ and completely solve the comparison problem

$$R_{a,b}(x, y, z) \leq R_{c,d}(x, y, z) \quad (a, b, c, d \in \mathbb{R}, 0 < x < y < z)$$

for this ratio. This generalizes, among others, the results of C. E. M. PEARCE and J. PEČARIĆ and F. QI, SH.-X. CHEN and CH.-P. CHEN.

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