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Title: Invariance of weighted quasi-arithmetic means with continuous generators

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Let $I \subset \mathbb{R}$ be an open interval and $p, q, r \in (0, 1)$. We find all continuous and strictly monotonic functions $\alpha, \beta, \gamma : I \rightarrow \mathbb{R}$ satisfying the functional equation

$$\begin{aligned} \lambda \alpha(\beta^{-1}(\mu \beta(x) + (1 - \mu) \beta(y))) + (1 - \lambda) \alpha(\gamma^{-1}(\nu \gamma(x) + (1 - \nu) \gamma(y))) \\ = \lambda \alpha(x) + (1 - \lambda) \alpha(y) \end{aligned}$$

generalizing the Matkowski–Sutô equation. In the proof we adopt a method elaborated by Z. Daróczy and Zs. Páles when solving the Matkowski–Sutô equation, some results of A. Járαι on improving regularity of solutions and an extension theorem by Z. Daróczy and G. Hajdu. We also use a theorem giving the form of all twice continuously differentiable solutions of the above equation proved jointly with J. Matkowski.

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