Title: Improved arithmetic-geometric and Heinz means inequalities for Hilbert space operators

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The main objective of this paper is an improvement of the original weighted operator arithmetic-geometric mean inequality in Hilbert space. We define the difference operator between the arithmetic and geometric means, and investigate its properties. Due to the derived properties, we obtain a refinement and a converse of the observed operator mean inequality. As an application, we establish one significant operator mean, which interpolates the arithmetic and geometric means, that is, the Heinz operator mean. We also obtain an improvement of this interpolation.

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