



Research article

Hermite-Hadamard type inclusions via generalized Atangana-Baleanu fractional operator with application

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Abstract: Defining new fractional operators and employing them to establish well-known integral inequalities has been the recent trend in the theory of mathematical inequalities. To take a step forward, we present novel versions of Hermite-Hadamard type inequalities for a new fractional operator, which generalizes some well-known fractional integral operators. Moreover, a midpoint type fractional integral identity is derived for differentiable mappings, whose absolute value of the first-order derivatives are convex functions. Moreover, considering this identity as an auxiliary result, several improved inequalities are derived using some fundamental inequalities such as Hölder-İşcan, Jensen and Young inequality. Also, if we take the parameter $\rho = 1$ in most of the results, we derive new results for Atangana-Baleanu equivalence. One example related to matrices is also given as an application.

Keywords: convex functions; Hermite-Hadamard inequality; Atangana-Baleanu fractional integral operators; Young inequality; Jensen’s inequality

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Abbreviations

H-H: Hermite-Hadamard; AB: Atangana-Baleanu; ABK: Atangana-Baleanu-Kashuri