



Operator-Theoretic Extensions of Hermite-Hadamard Type Inequalities

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Abstract

In this article, we introduce a unified operator-theoretic framework for Hermite-Hadamard type inequalities by employing pseudo-integral operators and associated differential operators. The proposed approach extends several known results involving classical, h -, (α, m) -, and $(h - (\alpha, m))$ -convex functions. New bounds are established for functions whose generalized derivatives satisfy operator convexity conditions. Applications to fractional-type means and numerical integration formulas are also discussed, demonstrating that the obtained results recover and improve a variety of existing inequalities as particular cases.

Keywords: Hermite-Hadamard inequality, pseudo-integral operator, pseudo-differential operator, generalized convexity, operator inequalities, nonlocal analysis.

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