

BOUNDS FOR THE NORMALIZED JENSEN-MERCER FUNCTIONAL

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ABSTRACT. We introduce the normalized Jensen-Mercer functional

$$\mathcal{M}_n(f, \mathbf{x}, \mathbf{p}) = f(a) + f(b) - \sum_{i=1}^n p_i f(x_i) - f\left(a + b - \sum_{i=1}^n p_i x_i\right)$$

and establish the inequalities of type

$$M\mathcal{M}_n(f, \mathbf{x}, \mathbf{q}) \geq \mathcal{M}_n(f, \mathbf{x}, \mathbf{p}) \geq m\mathcal{M}_n(f, \mathbf{x}, \mathbf{q}),$$

where f is a convex function, $\mathbf{x} = (x_1, \dots, x_n)$, and m and M are real numbers satisfying certain conditions. We prove them for the cases when \mathbf{p} and \mathbf{q} are nonnegative n -tuples and when \mathbf{p} and \mathbf{q} satisfy the conditions as for the Jensen-Steffensen inequality. We also give their integral versions in both cases.