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Inequalities for surface integrals of non-negative subharmonic functions

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Abstract: Let $\mathcal{H}$ denote the class of positive harmonic functions on a bounded domain Ω in $\mathbb{R}^N$. Let S be a sphere contained in $\overline{\Omega}$, and let σ denote the $(N-1)$-dimensional measure. We give a condition on Ω which guarantees that there exists a constant K, depending only on Ω and S, such that $\int_S u d\sigma \leq K \int_{\partial\Omega} u d\sigma$ for every $u \in \mathcal{H} \cap C(\overline{\Omega})$. If this inequality holds for every such u, then it also holds for a large class of non-negative subharmonic functions. For certain types of domains explicit values for K are given. In particular the classical value $K = 2$ for convex domains is slightly improved.

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