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Section:

8. Analysis

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The Poisson integral as an appropriate mean value

We present a short, group-assisted proof of the following theorem of M. Vignati: The Poisson integral of a function f over a sphere $S \subseteq \mathbb{R}^{n+1}$ at an interior point x coincides with the average of the Poisson integrals at x of f over all intersections of S with hyperplanes passing through x.
The statement remains true, if the hyperplanes are replaced by affine k-dimensional subspaces, for $1 \leq k \leq n$.
Reference: M. Vignati, On the factorization of Poisson integrals on spheres, *preprint*, Università degli Studi di Milano, 1990.