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10. Partial Differential Equations

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Harmonic Analysis of Functions

Sato's hyperfunctions are known to be represented as the boundary values of harmonic functions as well as those of holomorphic functions. G. Lebeau put this idea into practice for functions on the sphere $\mathbb{S}^n$. For example, we have a bijective Poisson mapping

$$P : \mathcal{B}(\mathbb{S}^n) \longrightarrow H(S^*\mathbb{S}^n)$$

where $H(S^*\mathbb{S}^n)$ is a kind of Hardy subspace of $\mathcal{B}(S^*\mathbb{S}^n)$. Moreover we have an isomorphism between Sobolev spaces

$$P : W^s(\mathbb{S}^n) \longrightarrow W^{s+(n-1)/4}(S^*\mathbb{S}^n) \cap H(S^*\mathbb{S}^n).$$

I will present some similar results in case of other functions not only on the sphere but also on $\mathbb{R}^n$.