On Principal Value and Standard Extension of Distributions

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Abstract:

For a holomorphic function $f$ on a complex manifold $M$ we explain in this article that the distribution associated to $|f|^{2\alpha}(\log|f|)^2|^N$ by taking the corresponding limit on the sets $\{|f| \geq \varepsilon\}$ when $\varepsilon$ goes to 0, coincides for $R(\alpha)$ non negative and $q,N \in \mathbb{N}$, with the value at $\lambda = \alpha$ of the meromorphic extension of the distribution $|f|^{2\lambda}(\log|f|)^2|^N$. This implies that any distribution in the $D_M$-module generated by such a distribution has the Standard Extension Property. This implies a non torsion result for the $D_M$-module generated by such a distribution. As an application of this result we determine generators for the conjugate modules of the regular holonomic $D$-modules associated to $z(\sigma)^\lambda$, the power $\lambda$, where $\lambda$ is any complex number, of the (multivalued) root of the universal equation of degree $k$, $z^k + \sum_{j=1}^{2k}(-1)^b\sigma_jz^{k-b} = 0$ whose structure is studied in [4].