ON THE DECOMPOSABILITY OF THE HOLONOMY LIE ALGEBRA OF AN ARRANGEMENT

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Abstract. Let $\mathcal{A}$ be a complex hyperplane arrangement, with fundamental group G, associated graded Lie algebra $\mathrm{gr}(G)$, and holonomy Lie algebra $\mathfrak{h}$. Suppose $\mathfrak{h}_3$ is a free abelian group of minimum possible rank, given the values the Möbius function takes on the rank 2 flats of $\mathcal{A}$. Then $\mathfrak{h} \cong \mathrm{gr}(G)$, and both Lie algebras decompose (in degrees ≥ 2) as direct products of free Lie algebras. This decomposition leads to an explicit, combinatorial formula for the ranks of the lower central series quotients of the group G.

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