Abstract. We provide an explicit thick and thin decomposition for oriented hyperbolic manifolds $M$ of dimension 5. The result implies improved universal lower bounds for the volume $\text{vol}_5(M)$ and, for $M$ compact, new estimates relating the injectivity radius and the diameter of $M$ with $\text{vol}_5(M)$. The quantification of the thin part is based upon the identification of the isometry group of the universal space by the matrix group $\text{PS}_\Delta L(2, \mathbb{H})$ of quaternionic $2 \times 2$-matrices with Dieudonné determinant $\Delta$ equal to 1 and isolation properties of $\text{PS}_\Delta L(2, \mathbb{H})$. 


Quaternions and Some Global Properties of Hyperbolic 5-Manifolds

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