

Hypersurfaces of $\mathbb{S}^3 \times \mathbb{R}$ and $\mathbb{H}^3 \times \mathbb{R}$ with constant principal curvatures

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Abstract. We classify the hypersurfaces of $\mathbb{Q}_\varepsilon^3 \times \mathbb{R}$ with three distinct constant principal curvatures, where $\varepsilon \in \{1, -1\}$ and \mathbb{Q}_ε^3 denotes the unit sphere \mathbb{S}^3 if $\varepsilon = 1$, whereas it denotes the hyperbolic space \mathbb{H}^3 if $\varepsilon = -1$. We show that they are cylinders over isoparametric surfaces in \mathbb{Q}_ε^3 , filling an intriguing gap in the existing literature. We also prove that the hypersurfaces with constant principal curvatures of $\mathbb{Q}_\varepsilon^3 \times \mathbb{R}$ are isoparametric. Furthermore, we provide the complete classification of the extrinsically homogeneous hypersurfaces in $\mathbb{Q}_\varepsilon^3 \times \mathbb{R}$. This is a joint work with J. B. M. dos Santos, F. Manfio and J. Van der Veken.