SECTION N. 04: DIFFERENTIAL GEOMETRY
TITLE: INVARIANT CMC SURFACES IN $\mathbb{H}^2 \times \mathbb{R}$

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Surfaces of constant mean curvature (CMC) play a special role in differential geometry. They arise in a variety of different branches. For example, the boundary of a compact domain Ω, which is a solution of the isoperimetric problem, is a CMC surface. In [2], W.T. Hsiang and W.Y. Hsiang studied solutions of the isoperimetric problem in the product of the hyperbolic space with the Euclidean space. In particular, they shown that a solution to the isoperimetric problem in $\mathbb{H}^2 \times \mathbb{R}$ is invariant under the action of an isometry subgroup of the type of $O(2) \times O(1)$ which fixes its centre of gravity. Therefore the boundary yields to a $O(2)$-invariant CMC surface in $\mathbb{H}^2 \times \mathbb{R}$. Due to this property, in [2], there is a description of the $O(2)$-invariant CMC surfaces in $\mathbb{H}^2 \times \mathbb{R}$.

In this poster we extend the result of W.T. Hsiang and W.Y. Hsiang classifying all CMC surfaces in $\mathbb{H}^2 \times \mathbb{R}$ which are invariant under the action of a 1-parameter subgroup G of the isometry group $Isom(\mathbb{H}^2 \times \mathbb{R})$.

The main ingredient is the Reduction Theorem of M. Do Carmo e W. Hsiang [1] which reduces the computation of the mean curvature of a G-invariant surface $\Sigma \subset \mathbb{H}^2 \times \mathbb{R}$ to that of $\Sigma/G \subset (\mathbb{H}^2 \times \mathbb{R})/G$. Using the Reduction Theorem we find a function J which is constant along the profile curve of a given G-invariant CMC surface. We than give a qualitative description of the G-invariant CMC surfaces by an accurate analysis of the equation $J =$ constant.

References

[1] A. Back, M.P. do Carmo, W.Y. Hsiang, On the fundamental equations of equivariant geometry (unpublished manuscript)

[2] W.T. Hsiang, W.Y. Hsiang, On the uniqueness of isoperimetric solutions and imbedded soap bubbles in non-compact symmetric spaces, *Invent. Math.* **89** (1989), 39-58.

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