CLASSIFICATION THEOREMS FOR MINIMAL SURFACES WITH FINITE TOTAL CURVATURE IN $\mathbb{H}^2 \times \mathbb{R}$

MAGDALENA RODRÍGUEZ

Abstract. In this talk we present some classification theorems for minimal surfaces with finite total curvature in $\mathbb{H}^2 \times \mathbb{R}$

In the last twenty years, after a seminal work by Rosenberg [6], the theory of minimal surfaces in $\mathbb{H}^2 \times \mathbb{R}$ has been actively developed. As in the case of the Euclidean space, the examples better undertood are those with finite total curvature. Huber's theorem [4] says that the examples with finite total curvature are conformally equivalent to finitely punctured compact Riemann surfaces. Hauswirth and Rosenberg [2] proved that the Hopf differential of one such surface extends meromorphically to the punctures (corresponding to te ends of the surface), and the total curvature must be a non-positive multiple of 2π. We will describe the asymptotic behaviour of the ends of this kind of surfaces (description included in [1]) and present the known examples and classification results: Hauswirth, Sa Earp and Toubiana [3] proved that the vertical planes are the only complete minimal surfaces with vanishing total curvature and in a joint work with Pyo [5] we classified the Scherk graph over an ideal quadrilateral as the only example with -2π total curvature. Finally we will describe the complete embedded minimal surfaces with total curvature -4π, result included in a joint work with Jesús Castro-Infantes.

References

[1] L. Hauswirth, A. Menezes and M. Rodríguez, On the characterization of minimal surfaces with finite total curvature in $\mathbb{H}^2 \times \mathbb{R}$ and $\widetilde{\mathrm{PSL}}_2(\mathbb{R})$. *Calc. Var. Partial Differ. Equ.* (2019) 58: 80. `https://doi.org/10.1007/s00526-019-1505-4`

[2] L. Hauswirth and H. Rosenberg, Minimal surfaces of finite total curvature in $\mathbb{H} \times \mathbb{R}$. *Mat. Contemp.*, 31 (2006), 65–80. `https://mc.sbm.org.br/wp-content/uploads/sites/9/sites/9/2021/12/31-4.pdf`

[3] L. Hauswirth, R. Sa Earp and E. Toubiana, *Associate and conjugate minimal immersions in $M \times \mathbf{R}$*, Tohoku Math. J. (2) 60 (2008), 267-286. `DOI: 10.2748/tmj/1215442875`

[4] A. Huber, *On Subharmonic Functions and Differential Geometry in the Large*, Comment. Math. Helvetic, **32** (1957), 181–206. `https://doi.org/10.1007/BF02564570`

[5] J. Pyo and M. Rodríguez, Simply-connected minimal surfaces with finite total curvature in $\mathbb{H}^2 \times \mathbb{R}$. em Int. Math. Res. Notices, 2014 (2014), 2944-2954. `https://doi.org/10.1093/imrn/rnt017`.

[6] H. Rosenberg, Minimal surfaces in $\mathbb{M}^2 \times \mathbb{R}$. *llinois J. Math.* 46(2002), 1177–1195. `DOI: 10.1215/ijm/1258138473`

Magdalena Rodríguez; Universidad de Granada
Email address: `magdarp@ugr.es`

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