On the correspondence between constant mean curvature spacelike graphs in Minkowski space and minimal graphs in Heisenberg group

José M. Manzano

Department of Mathematics, King's College London, Strand WC2R 2LS, London

H. Lee [1] discovered an interesting correspondence between spacelike graphs with constant mean curvature τ in Minkowski space $\mathbb{L}^3$ and minimal graphs in Heisenberg group $\mathrm{Nil}_3(\tau)$, which generalises the classical Calabi correspondence between maximal spacelike graphs in $\mathbb{L}^3$ and minimal graphs in Euclidean space $\mathbb{R}^3$.

In this talk, we shall introduce this conformal duality of graphs from the more general point of view of Killing submersions, which allows us to transform the prescribed mean curvature equation for spacelike graphs $\mathbb{L}^3$ into a minimal surface equation in certain 3-manifolds endowed with a unit Killing vector field. We will use several results of Cheng, Yau and Treibergs for spacelike graphs with constant mean curvature in $\mathbb{L}^3$ to obtain sharp geometric estimates on the height, area and curvature of entire minimal graphs in Heisenberg space. This talk is based on joint works with H. Lee [2], A. Lerma [3], and B. Nelli [4].

[1] H. Lee. Extension of the duality between minimal surfaces and maximal surfaces, *Geom. Dedicata* **151** (2011), 373–386.

[2] H. Lee, J.M. Manzano. Generalized Calabi's correspondence and complete spacelike surfaces. *Preprint*, arXiv:1301.7241.

[3] A. Lerma, J.M. Manzano. Compact stable surfaces with constant mean curvature in Killing submersions. *Ann. Mat. Pura App.* (to appear), arXiv:1604.00542.

[4] J.M. Manzano, B. Nelli. Height and area estimates for constant mean curvature graphs in $\mathbb{E}(\kappa, \tau)$-spaces. *J. Geom. Anal.* (to appear), arXiv:1504.05239.