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This talk reports on joint work with Masaaki Umehara and Kotaro Yamada.

It is well known that a minimal surface in Euclidean 3-space $\mathbb{E}^3$ is locally given by the real part of a *null* curve in complex Euclidean 3-space $\mathbb{C}^3$. Bryant [B] proved that a surface of constant mean curvature one in hyperbolic 3-space $\mathbb{H}^3$ is locally the projection from the special linear group $\mathrm{SL}(2,\mathbb{C})$ of a *null* curve to $\mathbb{H}^3 = \mathrm{SL}(2,\mathbb{C})/\mathrm{SU}(2)$. Any null curve in $\mathrm{SL}(2,\mathbb{C})$ is described in terms of two meromorphic functions which are called hyperbolic Gauss map and secondary Gauss map. (cf. [UY], [S])

On the other hand, Gálvez, Martínez and Milán [GMM] proved that a flat surface in $\mathbb{H}^3$ is locally the projection from $\mathrm{SL}(2,\mathbb{C})$ of a *Legendre* curve to $\mathbb{H}^3 = \mathrm{SL}(2,\mathbb{C})/\mathrm{SU}(2)$.

In this talk, we show that a Legendre curve in $\mathrm{SL}(2,\mathbb{C})$ is also described in terms of two meromorphic functions, and discuss some of its application to flat surfaces in $\mathbb{H}^3$.

References

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[UY] M. Umehara and K. Yamada, *Surfaces of constant mean curvature-c in $H^3(-c^2)$ with prescribed hyperbolic Gauss map*, Math. Ann. **304** (1996), 203–224.

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