Erratum to: Complete bounded null curves immersed in $\mathbb{C}^3$ and $SL(2, \mathbb{C})$

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In the previous paper [2, Theorem A], we stated the following assertion:

Theorem A *There is a complete holomorphic null immersion $X : \mathbb{D}_1 \rightarrow \mathbb{C}^3$ whose image is bounded. In particular, there is a complete bounded (immersed) minimal surface in $\mathbb{R}^3$ such that its conjugate minimal surface is also bounded.*

Here, we denote by $\mathbb{D}_1$ the open unit disk in $\mathbb{C}$. However, the authors have an serious error in the proof of Theorem A: In fact, the inequality (4.9) in [2] is incorrect, that should be replaced by

$$\text{dist}_{ds^2_{\mathbb{B}_{2N}}}(\zeta_j, p) < 2(\rho + s),$$

which immediately follows from the fact that the geodesic disc $\mathcal{D}_g$ is of radius $\rho + s$. This implies that the proof of Theorem A fails, and seems not to be recovered.

However, recently, Alarcón and López [1] have constructed a complete bounded null proper holomorphic immersion of a given Riemann surface of an arbitrary topology into a

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convex domain in $\mathbb{C}^3$ by a different method from ours, and so the statement of our Theorem A is now justified by their result. As applications of Theorem A in [2], the following objects were constructed:

- (1) complete bounded minimal surfaces immersed in the Euclidean 3-space $\mathbb{R}^3$ ([2, Theorem A]),
- (2) complete bounded holomorphic curves immersed in $\mathbb{C}^2$ ([2, Corollary B]),
- (3) weakly complete bounded maximal surfaces in the Lorentz-Minkowski 3-space $\mathbb{R}_1^3$ ([2, Corollary D]),
- (4) complete bounded holomorphic null curves immersed in $\mathrm{SL}(2, \mathbb{C})$ ([2, Theorem C]),
- (5) complete bounded constant mean curvature one surfaces immersed in the hyperbolic 3-space H^3 ([2, Theorem C]).

We also constructed higher genus examples of the first three objects in [3]. All of these applications in [2] and [3] are correct as a consequence.

References

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