Erratum to: “Null Mannheim curves in the Minkowski 3-space $\mathbb{E}^3_1$”

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Abstract: In this paper, Theorem 3.2 and Proposition 3.2 in the paper which is cited in the title are corrected.

We give the following Theorem 3.2* instead of Theorem 3.2 on page 111 in [1]. Its proof had been done in [2].

**Theorem 3.2**. A Cartan framed null curve $\alpha$ in $\mathbb{E}^3_1$ is a null Mannheim curve with timelike or spacelike Mannheim partner curve $\beta$ if and only if torsion $\tau$ of $\alpha$ is a nonzero constant.

According to the above Theorem 3.2*, we have following proposition 3.2* instead of Proposition 3.2 which is given in [1].

**Proposition 3.2**. If a timelike or spacelike generalized helix is the Mannheim partner curve of some Cartan framed null curve $\alpha = \alpha(s)$, then the curvature of the Cartan framed null curve $\alpha$ is

$$\kappa(s) = \frac{c_2}{(s + 2c_1)^2}$$

for some nonzero constants $c_1$ and $c_2$.

**Proof** Let $\alpha$ be a null Mannheim curve and $\beta$ be its timelike Mannheim partner curve. Assume that $\beta$ is a timelike generalized helix; then we have

$$< B, p > = ch\theta_0$$

for some constant vector $p$ and some constant angle $\theta_0$. If we consider Proposition 3.1 in [1], we have

$$ch\theta_0 \neq 0 \text{ and } \frac{\kappa}{\tau} \neq \text{const.}$$

(2)

Since $u$ is in the binormal direction of $\beta$, also we have from (1)

$$< u, p > = ch\theta_0 = \text{const.} \neq 0.$$  

(3)

If we derivate of (3) with respect to $s$ twice and use $\tau = \text{const.}$, we obtain

$$\tau < l, p > + \kappa < n, p > = 0$$

$$< n, p > = -\frac{2\kappa \tau ch\theta_0}{\kappa^2}$$

(4)

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Taking the derivative second or third equation of (4), we get nonlinear differential equation

\[ 2\kappa\kappa'' - 3(\kappa')^2 = 0. \]

Solving this equation, we obtain

\[ \kappa(s) = \frac{c_2}{(s + 2c_1)^2} \]

for some nonzero constants \( c_1 \) and \( c_2 \). Thus, the proposition is proved.

In case the spacelike generalized helix is the Mannheim partner curve of some Cartan framed null curve \( \alpha = \alpha(s) \), the proof is similar.

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References
