On generalized Bishop frame of null Cartan curve in Minkowski 3-space

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We define generalized Bishop frame of a null Cartan curve in Minkowski 3-space by using its Bishop's frame vector fields. We obtain the Cartan equations according to the generalized Bishop frame and give the relations between the generalized Bishop curvatures and Bishop curvatures. In particular, we also show that among all null Cartan curves in $\mathbb{E}_1^3$, only the null Cartan cubic has two generalized Bishop frames, one of which coincides with its Bishop frame. We also show that there exists a null Cartan curve whose generalized Bishop curvatures and Bishop curvatures are equal, but whose generalized Bishop frame and Bishop frame do not coincide. As an application, we characterize a k-type null Cartan slant helices for $k \in \{0, 1, 2\}$ according to the generalized Bishop frame, in terms of their generalized Bishop curvatures.

References

[1] L. R. Bishop, There is more than one way to frame a curve, Amer. Math. Monthly **82** (1975), 246–251.

[2] K. L. Duggal and D. H. Jin, Null Curves and Hypersurfaces of Semi-Riemannian Manifolds World Scientific, Singapore, 2007.

[3] M. Erdogdu, Parallel frame of non-lightlike curves in Minkowski space-time, Int. J. Geom. Methods Mod. Phys. **12** (2015), 16 pages.

[4] M. Grbović and E. Nešović, On the Bishop frames of pseudo null and null Cartan curves in Minkowski 3-space, J. Math. Anal. Appl. **461** (2018), 219–233.

[5] S. Yilmaz and M. Turgut, A new version of Bishop frame and an application to spherical images, J. Math. Anal. Appl. **371** (2010), 764–776.