On a new spherical triangle and its trigonometry

Sennimalai Kalimuthu

SF 779, Kanjampatti P.O, Pollachi Via, Tamil Nadu 642003, India

Email: sennimalaikalimuthu@outlook.com

Abstract:

According to Einstein and his followers space time geometry is gravity. Gravity is the manifestation of distortion of geometry of space due to presence of matter. The heart of these physical and cosmological phenomena is the line element or metric. This metric generated the field equation of Einstein general relative theory. Space time curvature, geodetic effect, frame tracking, gravitational lenses, gravitational red and blue shifts, block holes, dark matter, dark energy, big bang singularity, expansion of the universe and gravitational waves are the predictions of Einstein general relative theory. All these theoretical findings expect gravitational waves have been experimental test at to a very high degree of accuracy. In this work, the authors introduce an entirely new type of polar spherical triangle. The application of this triangle has been extended to Gabuzda- Wardle-Roberts superluminal motion equation and the consecution is noted.

Key words: spherical geometry and trigonometric, line element (metric), general relativity, time travel

MSC: 51M15

PACS: 03.30.+p, 98.80.-k, 03.67.-a,

1. Introduction:

Euclid's Elements is the first scientific text on the earth. In 300 BC, Euclid of Alexandria complied the then existing geometrical constructions and propositions Euclid introduced five postulates in Elements. Based upon his postulates, Euclid gives logical and mathematical proofs. Euclid assumes the first four postulates are obviously true. He was not content with his fifth postulates also known as the parallel postulate of Euclid geometry. Euclid himself tried his best to deduce Euclid V from Euclid I to IV. But his attempts were unsuccessful. Euclid does not require his last postulates up to the first 28 propositions of his work. His failure of showing the parallel postulate as a special theorem, forced him to proceed with 29th theorem of Elements. After Euclid, each and every top mathematician attempted to solve this problematic problem. Those attempts devote to establish the Euclid parallel postulates yielded a number of equivalent propositions to the fifth postulate and formulated at two new fields of non-Euclid geometries namely, Lobachevskian and Riemannian. The formulas of Lobachevskian geometry are widely applied to study the properties of sub atomic particles in this standard model of particle physics and to study velocity addition theorem in special relative theory. Einstein assumed the fundamental of Riemannian geometry for the formulation of his general relative theory which is the geometrical. Interpretation of gravity. This geometrical interpretation predicted the physical and cosmological phenomena as out line in abstract. In this work the author's materials and methods platform is a new type of polar spherical triangle, the new trigonometric relations and their application.
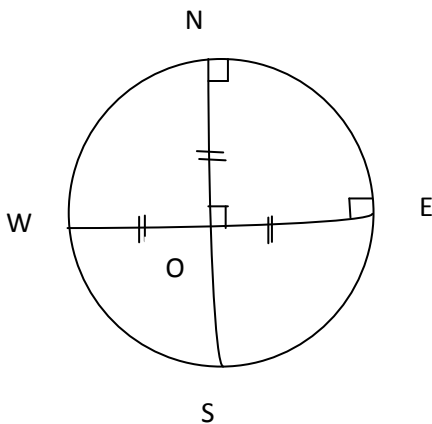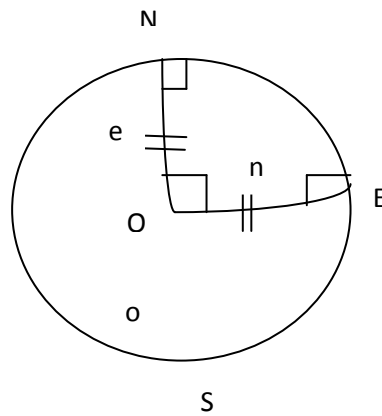
2. Materials and Methods

Figure 1

Figure 2

In Figure 1, NWSN is a great circle, EOW and NOS are arcs of great circle. The sides NW, WS, SE, EN, NO, SO, WO and EO are equal and the angles WNO, ENO, NOW, SWO, OSW, OSE, ACO, NEO, NOW, NOE are all right angles. Figure is the reconstruction of figure 1 omitting the arcs OW and OS.

3. Results

Each side of a spherical triangle must be less than $180°$.

Each angle of a spherical triangle must be less than $180°$.

In figure 2, ON is a side, OE is another side and NSE is the third side. So, by assuming these three sides we can have a spherical triangle NSEO. Since the angle NOE is 90˚, the remaining angle at O is 270˚. Angles OES and ONS are right angles. So, the sum of the interior our spherical triangle NSOE is equal to 450˚. Let side NSE= o, side ON=e and side EO= n.

4. Applications

For the speeds in units of c, $\beta = v/c$, in the usual interpretation of superluminal motion, the apparent velocity is given by

$$\beta_{app} = \frac{\beta_{jet} \, sinO}{1 - \beta_{jet} \, cosO} \qquad (1)$$

where β_{jet} is the jet velocity, and the jet makes an angle O to the line of sight[1],[2].

Assuming our new spherical triangle properties in equ.(1) [O= 270˚],

$$\beta_{app} = -\beta_{jet} \qquad (2)$$

The negative sign in RHS denotes backward time travel.

5. Discussion

Some theories, most notably special and general relativity, suggest that suitable geometries of space time, or specific types of motion in space, might allow time travel into the past and future if these geometries or motions are possible [11].

In spherical geometry the sides are the arcs (geodesics) of great circles. In our new type spherical triangle mentioned in section 2 side NSE is an arc of great circle NSEN, EO is the arc of equator and NO is an arc of longitude NOS. Kip Thorme in his block holes and Time Warps shows that a new type of consistent spherical geometry can reveal time travel phenomena [2]. Our new spherical triangle proposal may be extended to other branches of science and technology. This particular exploration may unlock some hidden phenomena.

References

[1] http://en.wikiversity.org/wiki/Mathematical_astronomy

[2] D. C. Gabuzda and J. F. C. Wardle and D. H. Roberts (January 15, 1989). "Superluminal motions in the BL Lacertae object OJ 287". *The Astrophysical Journal* 336(1) L 59-62

  doi:10.1086/185361.Bibcode: 1989ApJ...336L..59G

[3] Beyer, W. H. CRC Standard Mathematical Tables, 28th ed. Boca Raton, FL: CRC Press, pp. 131 and 147-150, 1987.

[4] Danby, J. M. Fundamentals of Celestial Mechanics, 2nd ed., rev. ed. Richmond, VA: Willmann-Bell, 1988.

 [5] Green, R. M. Spherical Astronomy. New York: Cambridge University Press, 1985.

[6] Smart, W. M. Text-Book on Spherical Astronomy, 6th ed. Cambridge, England: Cambridge University Press, 1960.

[7] Zwillinger, D. (Ed.). "Spherical Geometry and Trigonometry." §6.4 in CRC Standard Mathematical Tables and Formulae. Boca Raton, FL: CRC Press, pp. 468-471, 1995.

[8] J.D.H. Donnay : Spherical Trigonometry, Church Press, 2007, ISBN-10: 1406771104

[9] Todhunter, I. Spherical Trigonometry (5th ed.). MacMillan.1886

[10] http://en.wikipedia.org/wiki/Time_travel

[11] Thorne, Kip S. (1994). *Black Holes and Time Warps*. W. W. Norton. p. 499. ISBN 0-393-31276-3.