# On a new non Euclidean concept

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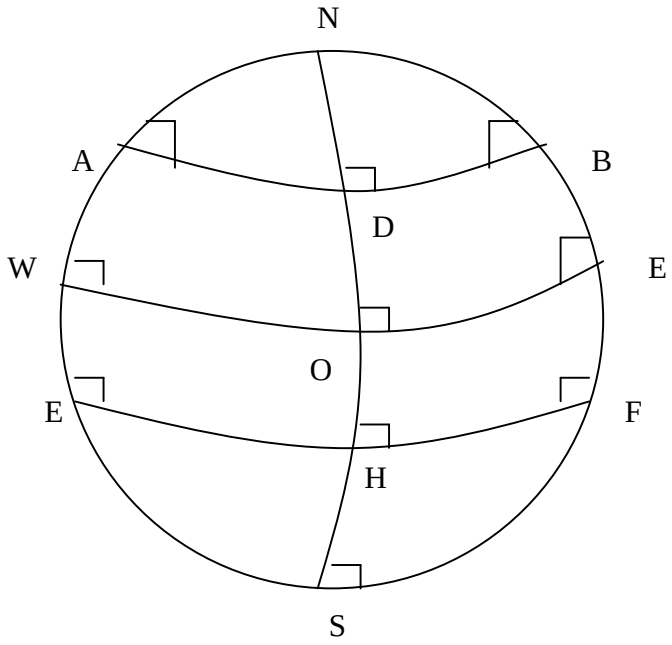


Spherical Figure 1

**Abstract**

In 1829, the famous Russian mathematician Lobachevsky published his first non – Euclidean geometry which is known as hyperbolic geometry. In 1854, the German mathematician Riemann published the second non – Euclidean geometry whose name is elliptic geometry. The contemporaries of Lobachevsky and Riemann never recognized these two geometries but unfortunately made flippant remarks on these two beautiful and ground breaking results. Einstein emerged in the arena and successfully applied the foundations of Riemannian geometry to formulate his general theory of relativity. Now the concepts of hyperbolic geometry are widely used in Einstein's special theory of relativity. One of the major and burning problem in theoretical; physics is the unification of general relativity and quantum mechanics. To achieve this goal, the author proposes for the creation of third non – Euclidean geometry.

**Key words:** Euclidean postulate , Hyperbolic & Elliptic non - Euclidean geometries

**MSC :** 51 M15

**PACS:** 02.40.Ky 02.40.Yy , 03.65.-w

**Construction**

In the spherical figure the great circle NS and the equator EW make four congruent triangles NOW , NOE , SOW and SOE as shown in the figure. In these four triangles , all the interior angles are right angles. With center N , radius NA, describe an arc cutting NW at A , NO at D and NE at B. Similarly , with center S and radius NA , draw an another arc passing through J , H and F on SW , SO and SE respectively.

**Results**

Assuming Euclid's equal sides subtend equal angles theorem we can prove that triangles NAD , NBD , SJH and SFH are congruent. Consequently we obtain that each interior angle of these four congruent triangles is equal to $90^0$. This results leads us to show that in spherical quadrilateral ABFJ, sides AB and FJ are equal; and sides AJ and BF are equal. From this we obtain that ABFJ is a spherical rectangle. Needless to say , this proves the fifth Euclidean postulate. But the fifth Euclidean postulate is one of the most famous mathematical impossibilities. The author has published several articles on this topic.[1], [2], [3], & [4]

**Discussion:**

After publishing his non – Euclidean paper Riemann wrote: " It is up to physicists to apply my result" The author also repeats this. It is well known that Einstein's general relativity is the geometrical description of gravity.Due to the presence of matter in the spacetime, the geometry of spacetime is distorted/ altered and the spacetime is warped.According to general relativity gravity is not a force but manifestion of spcatime curvature. The probes devoted to this work may throw fresh clues for the instant application to several burning problems of physics namely gravitational waves, dark matter , dark energy and quantum gravity.

**The following table states various properties of parabolic, hyperbolic and elliptic geometries:**

| Euclidean geometry | Hyperbolic geometry | Elliptic geometry |
|---|---|---|
| Two distinct lines intersect in one point | Two distinct lines intersect in one point | (single) Two distinct lines intersect in one point<br>(double) Two distinct lines intersect in two point |
| The sum of the measures of the angles of a triangle is $180^0$ | The sum of the measures of the angles of a triangle is less than $180^0$ | The sum of the measures of the angles of a triangle is greater than$180^0$ |
| Similar triangles that are not congruent exist | Similar triangles are congruent | Similar triangles are congruent |
| Rectangles exist | No quadrilateral is a rectangle | No quadrilateral is a rectangle |
| A line does not have finite length and is unbounded | A line does not have finite length | A line has finite length and is unbounded |
| Two parallel lines are equidistant | No two parallel lines are equidistant | Parallel lines does not exist |
| The summit angles of Saccheri quadrilateral are right angles | The summit angles of Saccheri quadrilateral are acute angles | The summit angles of Saccheri quadrilateral are obtuse angles |
| Two distinct lines do not enclose a finite area | Two distinct lines do not enclose a finite area | Two distinct lines enclose a finite area |
| The area of a triangle is equal to half the product of the base and height | The area of a triangle is proportional to its defect | The area of a triangle is proportional to its excess |
| A unique line perpendicular to a given line through a point not on the line | A unique line perpendicular to a given line through a point not on the line | (single) All lines perpendicular to a given line intersect at a point (pole)<br>(double)All lines |

| | | |
|---|---|---|
| | | perpendicular to a given line intersect at two antipodal points. |
| A line separates a plane | A line separates a plane | (single) A line does not separate a plane<br>(double) A line separates a plane |
| Curvature is zero | Curvature is negative | Curvature is positive |
| Given a line m and a point P not on m, the number of lines passing through P and parallel to m only one | Given a line m and a point P not on m, the number of lines passing through P and parallel to m is many | Parallel lines does not exist |
| Square of hypotenuse of a right triangle with sides a and b is $a^2 + b^2$ | Square of hypotenuse of a right triangle with sides a and b is greater than $a^2 + b^2$ | Square of hypotenuse of a right triangle with sides a and b is less than$a^2 + b^2$ |

## References


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