

On the New Branch of Mathematical Science-Part 2

¹M. Sivasubramanian, ¹L. Senthilkumar, ²K. Raghul Kumar and ³S. Kalimuthu

¹Department of Mathematics,

Dr. Mahalingam College of Engineering and Technology, Pollachi, Tamilnadu-642003, India

²Department of Physics, NGM College, Pollachi, Tamilnadu-642001, India

³212/4, Kanjampatti P.O, Pollachi via, Tamilnadu-642 003, India

Abstract: The fifth Euclidean postulate problem in geometry is 2300 years old. This postulate is also known as Euclid's parallel postulate. The great mathematicians tried their best to deduce the fifth postulate from the other four postulates. But unfortunately nobody could succeed in this geometrical battle. The studies devoted to this problem led to the origin of two non-Euclidean geometries. The authors resurveyed and established and gave a proof for this problem.

Key words: Euclid, elements, postulates, non-Euclidean geometries, physical applications

INTRODUCTION

Construction: Construct two congruent Lambert quadrilaterals as shown in Fig. 1. In Fig. 1, $AB = EF$, $BC = CF$, CD is common. The angles at A, B, C, F and E are right angles.

In this research, we do not assume Euclid's fifth postulate.

METHODS AND MATERIALS

In this study we begin where Saccheri and Lambert missed to obtain the result. In further studies the application of number theory, matrix algebra, set theory and quadratic, cubic and quadric equations may be used.

RESULTS

Case 1: In Lambert quadrilateral $ABCD$, if we assume that sides AB and CD are equal, then it is a Saccheri quadrilateral. Saccheri showed that the summit angles in his quadrilateral are equal. Since the angle at A is 90° , the angle at D is also 90° . This establishes Euclid's fifth postulate. But deducing the fifth Euclidean postulate from the first four postulates is not merely difficult but impossible. So, AB and CD cannot be equal

Case 2: Let us assume that CD is smaller than AB . On the extension of CD , make $CM = AB$. Join AM and EM . Now by SASAS correspondence, Saccheri

quadrilaterals $ABCM$ and $EFCM$ are congruent. So, angles BAM, CMA, CME and FEM are equal. Since angle BAD is 90° , angle MAM is obtuse. i.e., x is obtuse. So, the angle AME is more than 180° . Now produce AM up to R . From this we get that $2x+k = 180^\circ$. This is a contradiction. So, in Lambert quadrilateral $ABCD$, side CD cannot be smaller than side AB .

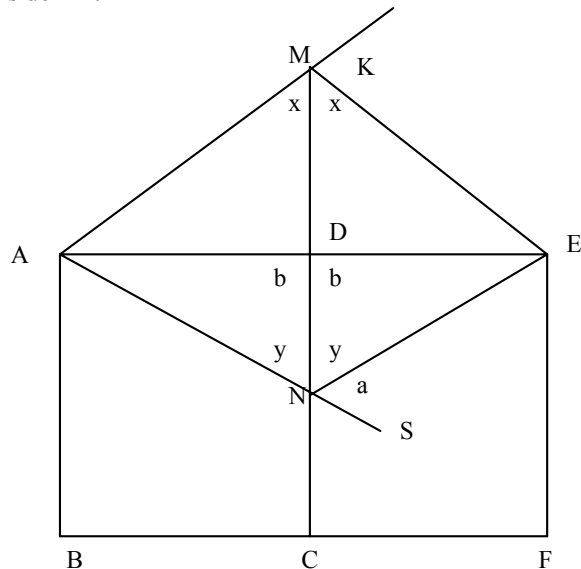


Fig. 1: Euclidean

Case 3: Let us assume CD is greater than AB . On CD , make $CN = AB$. Join AN and EN . As we have seen in case 2, Saccheri quadrilaterals $ABCN$ and $EFCN$ are

Corresponding Author: M. Sivasubramanian, Department of Mathematics, Dr. Mahalingam College of Engineering and Technology, Pollachi, Tamilnadu-642003, India

congruent. So, the angles BAN, CAN, CNE and FEN are equal. Since the angle BAD is 90° , angle BAN is acute. So, the angles CAN and CNE are equal and acute. Since angle CAN is acute, angle AND is obtuse. So, $2y$ is more than 180° . Now extend AN up to S. Here $2y+a = 180^\circ$. This is also a contradiction So, our assumption that CD is greater than AB is not acceptable.

DISCUSSION

From cases 1 2 and 3 we get that in Lambert quadrilateral ABCD, the lateral sides AB and CD is neither greater, nor smaller or equal. This is a peculiar geometrical phenomenon. Why is so? Where is the mystery? It is up to interested researchers to probe into this problem and unlock the hidden treasure which will definitely give birth to a new field of mathematical science. If AD and CD are equal, consequently this establishes the fifth Euclidean postulate which is impossible to prove.^[1, 2, 3, 4]

CONCLUSION

Labachevsky, the noted Russian mathematician, was the first person in the history of mathematics to formulate a model of non-Euclidean geometry which is also known as hyperbolic geometry. The formulae of this branch of geometry are widely used to study the properties of atomic objects in quantum physics. Also, the celebrated German mathematicians Gauss and Riemann developed the second branch of non-Euclidean geometry whose another name is elliptic geometry. Einstein by using the concepts of

Riemannian geometry nearly took 10 years to formulate his general theory of relativity. The authors do not make any top claim but politely state that their result is consistent. There is a hidden treasure. Further studies will definitely unlock this problematic problem and definitely give birth to a new branch of mathematics. A turning point in geometry is also a mile stone in physics. Modern physics is facing many odds. The new future field will solve some physical problems such as monopoles, quantum gravity, the dual property of electrons of an atom, antimatter, dark matter, shadow of matter, gravitons and black holes.

ACKNOWLEDGEMENTS

The authors wish to thank the management of Dr. Mahalingam College of Engineering and Technology, Pollachi, Tamilnadu-642003, India, for their kind encouragement. Also, the authors are grateful to Mr. Tv. Ravik Kumar, Mechanical Engineer, Nattukal Palayam Villa, Kanjampatty P.O., Pollachi, Tamilnadu-642003, India, for his magnanimous monetary assistance for the preparation of this paper.

REFERENCES

1. www.groups.dcs.standac.uk/~history/HisTopics/Non-Euclidean_geometry
2. www.cut-the-knot.org
3. <http://www.softsurfer.com/history.html>
4. www.beva.org/math323/asgn6/nov19.htm