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Application of Sivasubramanian Kalimuthu Hypothesis to Triangles

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Abstract: Problem statement: The interior angles sum of a number of Eu[illegible] was transformed into quadratic equations. The analysis of those quadratic equatio[illegible]elded [illegible]lowing proposition: There exists Euclidean triangle whose interior angle sum is a st[illegible] angle. **App[illegible]** [illegible] this study, the researchers introduced a new hypothesis for quadratic equ[illegible]nd derived an [illegible] new result. **Results:** The result of the study was controversial, [illegible]ma[illegible]tically consis[illegible]nt. **Conclusion/Recommendations:** The researchers politely requeste[illegible] the res[illegible] community to establish the quadratic equation's hypothesis.

Key words: Quadratic equations, tachyon physics, Euclid, e[illegible]nts, postulates, triangles and angles

INTRODUCTION

For two thousand years, many attempts were made to prove the parallel postulate using Euclid's first fo[illegible] postulates. The main reason that such a proof wa[illegible] highly sought after was that the fifth postulate isn't se[illegible] evident unlike the other postulates. If the order th[illegible] postulates were listed in the Elements is significant, it indicates that Euclid included this postu[illegible]y when he realised he could not prove it or pr[illegible] w[illegible]t it

Ibn Al-Haytham (Alhazen) ([illegible]1039), [illegible] Iraqi mathematician, made the first [illegible]pt at pr[illegible] parallel postulate using a proof by [illegible]di[illegible]n, whe[illegible] he introduced the concept o[illegible]tion a[illegible]sformation into geometry. He [illegible]mulated [illegible] Lambert quadrilateral, which [illegible] Abramovich [illegible]nfeld names the "Ibn al-H[illegible]a[illegible]bert quadrilate[illegible]l" and his attempted proo[illegible]lso sho[illegible]ilarities to Playfair's axiom.

Omar K[illegible]yám (1050-1123) m[illegible]he first attempt at form[illegible]g a [illegible]n-Euclidean postulate as an alterna[illegible]o the [illegible]lel postulate and he was the first to co[illegible] th[illegible]ases of [illegible]lliptical geometry and hyperboli[illegible]try, thou[illegible]e excluded the latter The [illegible]am-Sa[illegible] q[illegible]ateral was also first co[illegible]ed by O[illegible]yyam in the late 11th century in Bo[illegible] I of Expl[illegible]tions of the Difficulties in the Post[illegible] Euclid. Unlike many commentators on E[illegible] bef[illegible]nd after him (including Giovanni [illegible]olamo Saccheri), Khayyam was not trying to prove [illegible]arallel postulate as such but to derive it from an eq[illegible]nt postulate: "Two convergent straight lines inters[illegible]nd it is impo[illegible]e for two convergent straight lines t[illegible]erge in the d[illegible]tion in which they converge. He rec[illegible]d that [illegible]ee possibilities arose from omitting E[illegible]; if two perpendiculars to one [illegible] cross another line, judicious choice of the last can m[illegible] internal angles where it meets the two perp[illegible] equal (it is then parallel to the first line). If [illegible]se equal internal angles are right angles, we get [illegible]lid's Fifth; otherwise, they must be either acute or [illegible]use. He persuaded himself that the acute and obtuse c[illegible]s lead to contradiction, but had made a tacit assumption equivalent to the fifth to get there.

Nasir al-Din al-Tusi (1201-1274), in his Al-risala al-shafiya'an al-shakk fi'l-khutut al-mutawaziya (Discussion Which Removes Doubt about Parallel Lines) (1250), wrote detailed critiques of the parallel postulate and on Khayyám's attempted proof a century earlier. Nasir al-Din attempted to derive a proof by contradiction of the parallel postulate He was also one of the first to consider the cases of elliptical geometry and hyperbolic geometry, though he ruled out both of them.

Euclidean, elliptical and hyperbolic geometry. The Parallel Postulate is satisfied only for models of Euclidean geometry.

Nasir al-Din's son, Sadr al-Din (sometimes known as "Pseudo-Tusi"), wrote a book on the subject in 1298, based on Nasir al-Din's later thoughts, which presented one of the earliest arguments for a non-Euclidean hypothesis equivalent to the parallel postulate. "He essentially revised both the Euclidean system of axioms and postulates and the proofs of many propositions from

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the elements. His research was published in Rome in 1594 and was studied by European geometers. This study marked the starting point for Saccheri's work on the subject.

Giordano Vitale (1633-1711), in his book Euclide restituo (1680, 1686), used the Khayyam-Saccheri quadrilateral to prove that if three points are equidistant on the base AB and the summit CD, then AB and CD are everywhere equidistant. Girolamo_Saccheri (1667-1733) pursued the same line of reasoning more thoroughly, correctly obtaining absurdity from the obtuse case (proceeding, like Euclid, from the implicit assumption that lines can be extended indefinitely and have infinite length), but failing to debunk the acute case (although he managed to wrongly persuade himself that he had).

Where Khayyám and Saccheri had attempted to prove Euclid's fifth by disproving the only possible alternatives, the nineteenth century finally saw mathematicians exploring those alternatives and discovering the logically_consistent geometries which result. In 1829, Nikolai Ivanovich Lobachevsky published an account of acute geometry in an obsc[illegible] Russian journal (later re-published in 1840 in Germ[illegible]. In 1831, János_Bolyai included, in a book by his fath[illegible] an appendix describing acute geometry, which[illegible] doubtlessly, he had developed independently of Lobachevsky. Carl Friedrich Gauss had [illegible]tudied the problem before that, but he did [illegible] publi[illegible]ny of his results. However, upon hearing [illegible]oylai's [illegible] in a letter from Bolyai's father, Fark[illegible]lyai, he [illegible]

"If I commenced by sa[illegible]ing [illegible] a[illegible]nable t[illegible] praise this study, you woul[illegible]tainly [illegible]prised for a moment. But I cannot sa[illegible]erwise. To p[illegible] it would be to praise myself. [illegible] the whole con[illegible]f the work, the path take[illegible] y[illegible]n, the results t[illegible] which he is led, coincide a[illegible]most ent[illegible]ith my meditations, which have oc[illegible]ied my mind p[illegible] for the last thirty or thirty-fiv[illegible]rs."

The [illegible]ting ge[illegible]metries were later developed by Lobac[illegible]y, Rie[illegible] and Poincaré into hyperbolic geome[illegible] case) a[illegible] spherical geometry (the obtuse cas[illegible] independ[illegible] of the parallel postulate [illegible]Euclid's [illegible] axio[illegible]was finally demonstrated by [illegible] Beltran[illegible].

Con[illegible]: In the Euclidean construction as shown in [illegible]1.

[illegible]Draw a t[illegible]ngle ABC. Choose points D and E on [illegible] Join A and D; Join A and E.

[illegible]mall letters x, y and z denote the sum of the inte[illegible]angles of triangles ABD, ADE and AEC respectively. Let a, b and c respectively refer to the sum of the interior angles in triangles ABE, ADC and ABC.

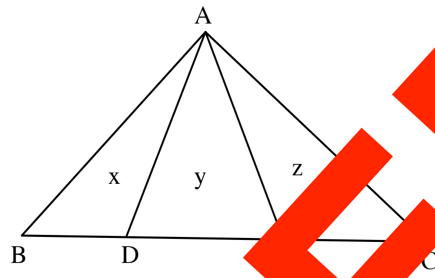

Fig. 1: Euclidean

Angles:

ADB+ADE = A[illegible] AEC[illegible]0° = v (say) (1)

Using [illegible]

$x+y =$ [illegible] (2)

$y+z =$ [illegible] (3)

$x+b = v+$[illegible] (4)

Squaring (2):

x^2+2[illegible]$+a^2+2va$ (2a)

Squaring (4):

[illegible]$^2+2xb = v^2+c^2+2vc$ (4a)

From (2a):

$$x^2+2xy+y^2-v^2-a^2-2va = 0 \quad (2b)$$

From (4a):

$$x^2+2xb+b^2-v^2-c^2-2vc = 0 \quad (4b)$$

If α and β are the roots of (2b), then according to the laws of quadratic equations,

$$\alpha+\beta = -\frac{B}{A} \quad (5)$$

and

$$\alpha\beta = \frac{C}{A} \quad (5a)$$

(5)+(5a) shows:

$$\alpha+\beta+\alpha\beta = \frac{C-B}{A} \quad (6)$$

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Applying (6) in (2b):

$$\alpha+\beta+\alpha\,\beta = -2y-v^2-a^2-2va \quad (7)$$

Assuming (6) in (4b):

$$\alpha+\beta+\alpha\,\beta = -2b-v^2-c^2-2vc \quad (8)$$

Applying Sivasubramanian Kalimuthu hypothesis in (7) and (8):

$$\begin{aligned} &2y + v^2 + a^2 + 2va = 2b + v^2 + c^2 + 2vc \\ &\text{i.e., } 2b - 2y + c^2 - a^2 + 2v(c-a) = 0 \\ &2b - 2y + (c+a)(c-a) + 2v(c-a) = 0 \\ &\text{i.e., } 2b - 2y + (c-a)(c+a+2v) = 0 \end{aligned} \quad (9)$$

(4)-(2) gives b-y = c-a (10)

Putting (10) in (9), 2 (c-a)+(c-a) (c+a+2v) = 0

i.e., (c-a) (2v+2+c+a) = 0

Since the second factor can NOT be equal to ze[illegible] c-a = 0:

i.e., c = a (11)

Putting (11) in (10):

y = b (1[illegible])

Applying (12) in (3):

z = v = 180° [by 1] (13)

From (13) [illegible] get that the s[illegible] the interior angles of triangle:

AEC is [illegible]aight a[illegible] (14)

[illegible]RIALS [illegible] METHODS

[illegible]ition s[illegible] multiplication and division are t[illegible] four funda[illegible]al operations of number theory. Mult[illegible] is the shortest form of addition. And di[illegible]n is [illegible]est way of subtraction. So, these four [illegible]ations are reduced to only two operations viz. [illegible]tion and subtraction. By applying the "addition" op[illegible]n of number theory, the triangle properties were trans[illegible]med into linear algebraic equations and the linear algebraic equations were converted into quadratic equations. The laws of set theory may be appli[illegible] future investigations.

RESULTS

Although the result (14), i.e., [illegible] sum o[illegible] interior angles of the Euclidean tr[illegible]e AEC = Tw[illegible] right angle is controversial, [illegible]s mat[illegible]atically consistent. This result can be [illegible]y exte[illegible] to both Lobachevsky, Riemann triangles[illegible]

DI[illegible]SSION

Let us recall [illegible] the [illegible]us French mathematician Legendre shown [illegible]at if the [illegible]f the interior angles of any triangle is equal to two [illegible]ngles, the parallel postulate [illegible]nce we have [illegible]ed (14) without assum[illegible]e fifth Euclidean postulate, Eq. 14 proves the p[illegible]lel postulate[1-3]. But the mere existence of consi[illegible]t models [illegible] Non-Euclidean geometries demo[illegible]e the Eucli[illegible] cannot be deduced from Euclid [illegible]id IV. B[illegible]r result is consistent. There is something [illegible]sure of mathematics. Further [illegible]be will unlo[illegible] mystery.

CONCLUSION

[illegible]quation 14 reveals that there is something hidden [illegible]sures of mathematics. Only further studies will [illegible]k this mystery. Future probe may give rise to a new field of geometry.

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