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On Gödel's incompleteness theorems

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Abstract

In this short communication, the mathematical variation of the Liar's paradox of the Godelian incompleteness theorem was proved.

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1 Introduction

In 1931, an young Austrian mathematician Kurt Gödel published a paper in mathematical logic. In this ground breaking paper, he has proved two propositions. Gödel's findings are called Gödel's incompleteness theorems. This work was a masterstroke for Hilbert's second theorem. Gödel's theorems are given below:

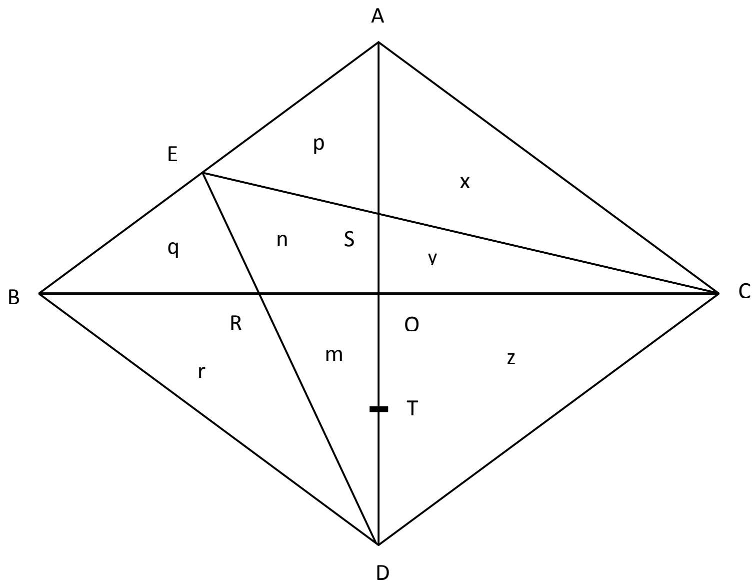
Theorem 1**:** In any logical system one can construct statements that are neither true nor false (mathematical variations of the liar's paradox).

Theorem 2**:** Therefore no consistent system can be used to prove its own consistency. No proof can be proof of itself. [http://milesmathis.com/godel.htm]

In this short work, we are going to establish the first theorem.

2 Construction

Draw triangles ABC and DBC as shown in figure 1. On AB, choose a point E. Join C and E. Join E and D meeting BC at R. Since points E and D lie on the opposite sides of BC, ED can meet BC. Please note that Euclid uses this principle. [Elements I, prop.10] Similarly join A and D contacting EC at S and RC at O. Small letters denote the angle sums of triangles and quadrilateral ORES. Also, let that a , b , c , d , e , f , g , h , i , j , k , l , t and w respectively refer to the sum of the interior angles of triangles and quadrilaterals ACD, ACO, CDS, AED, SED , AERO, BDE, AEC, EBC, ERC, BOSE, BCD, CDR and BOD.



Euclidean figure 1

3 Results

The angles BRO, ROC , ERD , ASO , SOD , ESC and AEB are all straight angles and so their measures are all equal to 180 degrees. Let v be the value of this 180 degrees. (1)

Applying (1), $x + y + z = 2v + a$ (2)

$$x + y = v + b \quad (3)$$

$$y + z = v + c \quad (4)$$

$$m + n + p = 3v + d \quad (5)$$

$$m + n = 2v + e \quad (6)$$

$$p + n = v + f \quad (7)$$

$$q + r = v + g \quad (8)$$

$$x + p = v + h \quad (9)$$

$$y + n + q = 3v + i \quad (10)$$

$$y + n = 2v + j \quad (11)$$

$$n + q = v + k \quad (12)$$

$$z + m + r = 2v + l \quad (13)$$

$$z + m = v + t \quad (14)$$

$$m + r = v + w \quad (15)$$

Adding (2) to (15) we have, $3x + 5y + 4z + 5m + 6n + 3p + 3q + 3r =$

$$22v + a + b + c + d + e + f + g + h + i + j + k + l + t + w$$

Putting (4) , (6) , (8) and (9) in LHS, $2h + 2g + 3c + 4e + y + n =$

$$2v + a + b + d + f + i + j + k + l + t + w$$

Applying (11) in LHS, $2h + 2g + 3c + 4e = a + b + d + f + i + k + l + t + w$ (16)

(4) + (6) = (11) + (14) = $y + z + m + n = 3v + c + e = 3v + j + t$, i.e $c + e = j + t$ (17)

Applying (17) in (16) we obtain that, $2g + 2h + 2c + 3e + j =$

$$a + b + d + f + i + k + l + w$$

$$2v + a = x + y + z \quad (2)$$

$$v + b = x + y \quad (3)$$

$$3v + d = m + n + p \quad (5)$$

$$v + f = p + n \quad (7)$$

$$3v + i = y + n + q \quad (10)$$

$$v + k = n + q \quad (12)$$

$$2v + l = z + m + r \quad (13)$$

$$v + w = n + r \quad (15)$$

$$y + n = 2v + j \quad (11)$$

$$m + n = 2v + e \quad (6)$$

Adding the above eleven relations, $10v + 2g + 2h + 2c + 3e =$

$$2x + 2y + 2z + m + 3n + 2q + 2p + 2r$$

Assuming (4), (6), (8) and (9) in RHS, $2v + 2e = 2n$, i. e $n = v + e$ (18)

Applying (18) in (6) we obtain that, $m = v$ (19)

Comparing (1) and m we get that the sum of the interior angles of triangle

ORD is equal to two right angles (20)

Needless to say, (20) proves Euclid's fifth postulate. [1 – 4] (21)

4 Discussions

It is well known that Beltrami, Klein, Cayley, Poincare and others have shown that it is impossible to deduce Euclid V from Euclid I to IV. But the author's equation (21) proves the fifth Euclidean postulate. A brief analysis of these two theorems shows that it established Gödel's first incompleteness theorem mentioned above.

References

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