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A phenomenon in matrix analysis for physical applications

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Abstract: The history of matrices goes back to ancient times! But the term "matrix" was not applied to the concept until 1850."Matrix" is the Latin word for womb, and it retains that sense in English. It can also mean more generally any place in which something is formed or produced. The origins of mathematical matrices lie with the study of systems of simultaneous linear equations. An important Chinese text from between 300 BC and AD 200, *Nine Chapters of the Mathematical Art* (Chiu Chang Suan Shu), gives the first known example of the use of matrix methods to solve simultaneous equations. Since their first appearance in ancient China, matrices have remained important mathematical tools. Today, they are used not simply for solving systems of simultaneous linear equations, but also for describing the quantum mechanics of atomic structure, designing computer game graphics, analyzing relationships, and even plotting complicated dance steps! The elevation of the matrix from mere tool to important mathematical theory owes a lot to the work of female mathematician Olga Taussky Todd (1906-1995), who began by using matrices to analyze vibrations on airplanes during World War II and became the torchbearer for matrix theory. In this work, by applying the fundamental concepts of matrices, the author attempts to study the fifth Euclidean postulate problem and Gödel's incompleteness theorems.

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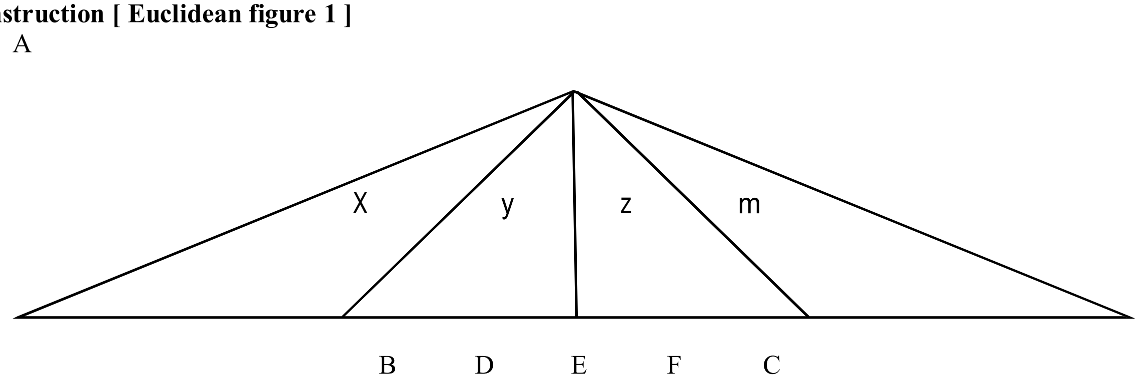
Construction [Euclidean figure 1]



Let ABC be the given triangle. Take points S, E, and F on BC. Join A and D; join A and E and join A and F. Small letters x, y, z and m respectively refer to the angle sums of triangles ABD, ADE, AEF and AFC. Also, let a, b, c, d and e respectively refer to the sum of the interior angles of triangles ABE, ADF, AEC, ABF and ADC.

Results

The angles BDE, DEF and EFC are all straight angles and so their measures are all equal To 180 degrees. Let v be the value of this 180 degree. (1)

Assuming (1) and adding, x + y = v + a(2)

y + z = v + b (3)

z + m = v + c (4)

a + z = v + d (5)

y + c = v + e (6)

Let us transform the elements of equations (2) to (6) in to the following four matrices:

A = { 0 0 0 0-v z } (7)

B = { x -y m -z v -z } (8)

C = { a -b c -d 0 v } (9)

D = { e 0 -v v v -a }					(10)
A + B + C + D = { x+a+e -y-b	m+c-v	v-z-d	v	v -a }	(11)
A – B = { -x y -m z -2v 2z }					(12)
D – C = { e-a b -v-c -v –d v	-a-v }				(13)

Adding these three, 2A + 2D = { 2e 0 -2v -2d 0 2z-2a } (14)

From (7.6) and (10.,6)2A +2D = { 2e 0 -2v 2v 0 2z -2a } (15)

Equating the above two we get that 2v = -2d (16)

It is well known that in geometry, minus theta is the vertically opposite angels.

Since vertically opposite angles are equal we get from (17) that d = v (17.)

Comparing (1.6) and (17.6) we obtain that the interior angle sums of triangle ABF is 180 degrees. (18)

Discussion

The famous French mathematician proved that the fifth Euclidean postulate holds iff, there exists any [please note not given] triangle whose interior angle sum adds to 180 degrees. So, mathematically and logically putting eqn. (18) establishes Euclid's fifth postulate. But, in the nineteenth century Beltrami, Cayley, Klein, Poincare and others showed that it is impossible to Deduce Euclid V from Euclid I to IV. So, this problematic situation. Let us recall that in 1931, the young Austrian mathematician by name Kurt Gödel proved the in completeness of mathematics. Miles Mathis formulated the following equivalent proposition to Gödel's incompleteness theorems: In a formal axiomatic mathematical system, we can construct a statement which is neither true nor false. To put this in another words, In mathematics, we can construct a statement and its denial. To conclude briefly, eqn. (18) confirms Miles Mathis's proposition.

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