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Introduction Of A Constant Fundamental To Pi (II)

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Abstract-

This mathematical work was aimed to find the value which is fundamental to pi (π), for this purpose the search through calculations was carried out. This value was found to be 0.67592629..., which yields not only values related to pi such as 1.77245385, 1.36913881, 0.29457572 etc. but also value of pi itself. This value is fundamental to its derived constant pi (π).

Method-

A review [1] is available regarding the study of pi from its discovery in the ancient times to continual various ways to get its value and then its use as a part of simple geometry formulae to the great equations of the physics. For simplicity purpose, here we consider values only up to eight decimals for calculations. Let's start with a value 0.67592629 ($= 4.17143549 / 6.17143549$) for getting values related to pi and pi itself as follows.

$$0.67592629 = (2.29457572 \times 0.29457572) \quad \text{---- (1)}$$

$$= \{(1.77245385 / 0.77245385) \times [(1 - 0.77245385) / 0.77245385]\}$$

$$= (1.77245385 - 1.36913881) \times (1.67592629) \quad \text{.[Where, } 1.67592629 = 1.29457572 \times 1.29457572]$$

$$0.67592629 = [(1.29457572 \times 0.29457572) + 0.29457572] \quad \text{----- (2)}$$

$$0.67592629 = (1.29457572^2 - 1) \quad \text{----- (3)}$$

Dividing eq. (2) by eq. (1) and dividing eq. (3) by eq. (1) solving further we get

$$2.29457572 / 1.29457572 = 1.77245385$$

$$(2.29457572 / 1.29457572^2) = (2.29457572 / 1.67592629) = 1.36913881$$

$$(2.29457572 / 1.29457572)^2 = (1.77245385 + 1.36913881) = 3.14159265 = \pi$$

Interrelation among the above values obtained from 0.67592629

$$[2.2945757 + (2.29457572 / 1.29457572)] \times (1 / 1.29457572) = \pi$$

$$[2.2945757 \times (2.29457572 / 1.29457572)] \times (1 / 1.29457572) = \pi$$

$$[2.2945757 / (2.29457572 / 1.29457572)] \times (1 / 1.29457572) = 1$$

$$[2.2945757 - (2.29457572 / 1.29457572)] \times (1 / 1.29457572) = \pi^*$$

$$(0.67592629 / 1.67592629) \times (1 / 0.29452629) = 1.36913881$$

$$(0.67592629 / 1.67592629) \times (1.29457572 / 0.29457572) = 1.77245385$$

The interrelation between values 1.67592629 and 0.67592629 as follows,

$$[0.67592629 / (1.67592629 - 1.67592629^{0.5})] + [0.67592629 / (1.67592629^{1.5} - 1.67592629)] = \pi$$

Adding the denominators from above equation to get value 0.67592629

$$[(1.67592629 - 1.67592629^{0.5}) + (1.67592629^{1.5} - 1.67592629)] = 1.67592629^{0.5} \times 0.67592629$$

$$\{[(1.67592629 - 1.67592629^{0.5}) + (1.67592629^{1.5} - 1.67592629)] / 1.67592629^{0.5}\} = 0.67592629$$

Also,

$$\{2 \times [0.29457572 / (0.67592629 - 0.29457572)]\} + [(2 + 0.67592629) + (1 + 0.67592629)] = \pi$$

$$[0.67592629 / (0.67592629 - 0.29457572)]^2 = \pi$$

$$[0.67592629 / (0.67592629 - 0.29457572)] + \{0.67592629 / [0.67592629 - (2 \times 0.29457572)]\} = \pi$$

$$1) \{[\pi / (0.67592629 / 1.67592629)] / (1.29457572^{4.00117092})\} - 1 = \pi^{0.5} = 1.77245385$$

$$2) \{[\pi / (0.67592629 / 1.67592629)] / (1.29457572^{5.00117092})\} + 1 = \pi$$

$$3) 1.67592629^{2.21689625} = \pi \quad \text{Where, } (0.67592629 \times 2.21689625) = (3.00618523 / 2.00618523)$$

$$0.67592629 = [(1.77245385 + 1.36913881) \times 0.29457572] / [(1.77245385 - 1.36913881) \times (1/0.29457572)]$$

$$= [\pi \times (0.29457572)] / [\pi^* \times (1 / 0.29457572)] \text{ ----- (4)}$$

$$\pi = (1 + 0.77245385) \times (1 + 0.77245385) = \{(1 + 0.77245385) + [(1 + 0.77245385) \times 0.77245385]\}$$

$$\pi^* = (1 - 0.77245385) \times (1 + 0.77245385) = \{(1 - 0.77245385) + [(1 - 0.77245385) \times 0.77245385]\}$$

$$\pi^* = \{[(1.77245385 \times 1.36913881) \times (0.29457572)] / [(1.77245385 / 1.36913881) \times (1/0.29457572)]\}^{0.5}$$

Result –

Above all the calculations show that the value 0.67592629... is fundamental to value of pi as it yields value of pi(π) furthermore eq.4 shows the inclusive nature of this value as it involves both π and π^*

Conclusion –

The value 0.67592629... yields all the values related to pi and pi itself proving its fundamental nature over its derivative pi (π).

Reference –

[1] Mundase Radhika et.al.(2002), Review of application of pi : a study, International advance journal of engineering science and management, 154-161.