

The constant e research paper sample

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Introduction

The constant 'e' is a numerical constant. This irrational number is widely used in science and mathematics and is approximately equivalent to 2.71828. Generally, a constant is a special number that plays a significant role in various contexts including calculus, geometry and number theory. The constant 'e' as a special constant becomes relevant in the event that a circle's circumference is divided using its diameter.

Applications of 'e'

There are quite a number of formulas that apply this constant (O'Connor and Robertson, 2012, pp. 1). The non-linear equation of decrease and increase (growth and decay situations) is a one of the examples of application. Another example is the statistical bell curve describing the resultant shape of an arch or a cable that is hanging.

The same constant has been used in problems involving probability and prime number distribution and counting. The cases of ultrasound attenuation in evaluation of non-destructive process are also known to rely on the constant. Scientific research reveals that the energy of sound diminishes as one moves its source by a special factor that is a derivative of the constant 'e'. The natural occurrence of this constant with regard to a specific frequency ensures that is used as a base for natural logarithms (NDT Resource Centre, n. d., pp. 1).

Mathematicians involved in the study of ‘ e’

Sebastian Wedeniwski managed to come up with the constant. To achieve the desired precision, he presented the constant with regard to 869, 894, 101 decimals (NDT Resource Centre, n. d., pp. 1). It should however be noted that Leonard Euler (Swiss mathematician) was the first scholar to study the constant. Successive studies were based on the findings of John Napier who invented logarithms. It is such a coincidence how Euler (name starts with an ‘ e’) yet he was among the first users of the constant. The constant is therefore known by a number of names. This is an attribute of scientists who played significant roles to discover and show how it can be applied. The constant ‘ e’ can therefore be known as the Eulerian Number, Napier’s Constant or the Euler Number. Euler managed to prove that the constant as a number, is irrational. This is on the basis of the fact that is not periodic and its infinite decimal expansion.

The use of a sum of factorials has been proven to be more reliable as compared to ‘ equation 1’ above. This is the most effective method when it comes to coming up with the value of ‘ e’. Charles Hermite (French mathematician) regards this constant as a transcendental number since it cannot be classified as a root of any given ‘ polynomial with rational number coefficients’ (Ask Dr. Math, 2012, pp. 1). The constant ‘ e’ shares such properties with the constant ‘ pi’.

The sum of factorials with respect to 22 decimal places gives an approximate figure (e) of 2. 7182818284590452353602875 ($e = 1/0! + 1/1! + 1/2! + 1/3! + 1/4! + \dots + 1/25!$). It is worth noting that recent studies have revealed even more reliable methods of calculating the constant (Ask Dr. Math, 2012, pp.

1). Other mathematicians who were involved in the study of the constant include Briggs (1624), SaintVincent (1647), Huygens (1661), Nicolaus Mercator (1668), Jacob Bernoulli (1683) and James Gregory (1684). They partly worked on the constant e along with other studies. Proper studies to determine the most accurate value of ' e' begun as from 1690 by Leibniz.

Conclusion

In conclusion, from the above description it is evident how the constant ' e' is very significant in various aspects. It is however recommended that scientists should continue dedicating their time in line with discovering even more efficient methods of calculating the constant.

References

Ask Dr. Math. What is e? Who first used e? How do you find it? How many digits does it have? [online] Available at: [Accessed 18 May 2012].

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