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THE HISTORY OF THE HYPERCOMPLEX NUMBER

Hypercomplex numbers are composite numbers that allow simplifying the mathematical description of certain problems. They are used in signal processing, computer graphics, relativistic kinematics, orbital mechanics, air and space flight. The author came across hypercomplex numbers in accelerator physics, where they can be used to describe symplectic transformations. Hypercomplex numbers come along with matrix representations that reproduce the laws of addition and multiplication.

The hypercomplex numerical system is the extension of complex numbers.

The study of the above mentioned extensions is a new scientific and practical direction their development it caused serious difficulties and demanded the effort of leading experts [1].

In the nineteenth century the numeric systems called quaternions, tessarines, coquaternions, biquaternions and octonions became established concepts in mathematical literature, added to the real and complex numbers. The concept of a hypercomplex number covered them all, and called for a discipline to explain them.

Quaternions were discovered by William Rowan Hamilton in 1843. Hamilton was looking for ways of extending complex numbers (which can be viewed as points on a plane) to higher spatial dimension. He could not do so for 3 dimensions, but 4 dimensions produced quaternions. According to the story he told, he was out walking one day with his wife when the solution in the form of equation $i^2 = j^2 = k^2 = ijk = -1$ suddenly came into his mind; he then promptly carved this equation into the side of nearby Brougham bridge (now called Broom Bridge) in Dublin.

Quaternions have been discovered by Hamilton after 10 years of research of possible fields of triples or quadruples.

The invention of the quaternion numbers has contributed to the creation of a number of important sections of modern mathematics, particularly matrix theory, multidimensional geometry and others. The quaternions have been successfully used in the theory of numbers, theoretical mechanics and theoretical physics [2].

LITERATURE

1. E- Study Guide for Number Theory: An Introduction to Mathematics, textbook by W.A. Coppel: Mathematics: 2012. – 119 p.
2. Кантор И.Л. Гиперкомплексные числа./И.Л. Кантор, А.С. Солодовников – Москва: Наука: 1973. – 144с.