A COMPLEX TYPE NUMBER SYSTEM FOR HIGHER DIMENSIONAL SPACES AND ANALYSIS

T. Pio Jude Navinthan

Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka
Department of Mathematics, University of Peradeniya, Peradeniya, Sri Lanka

We propose an extension to the classical complex number system from the space of real sequences. We show that the new complex type number system forms a field over the real or complex field with infinite dimension. We explore some possible exponential and trigonometric formulations to this new complex type numbers and investigate their properties.

The complex type numbers is used to represent three dimensional physical spaces with Cartesian coordinates. Considering a 3-dimensional complex type variable, we construct Cauchy-Riemann type conditions for the differentiability of complex type valued function of complex type variable in 3-dimensional spaces. From this, we construct a basis for harmonic functions in 3-dimensional spaces.