

THE PRODUCT OF DIAMOND OPERATOR AND HELMOLTZ OPERATOR RELATED TO THE BIHARMONIC EQUATION AND THE WAVE EQUATION

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Abstract

Firstly, we study the solution of equation $\diamond^k(\Delta + m^2)^k u(x) = f(x)$. Finally, we study the solution of nonlinear equation $\diamond^k(\Delta + m^2)^k u(x) = f(x, \Delta^{k-1} \square^k(\Delta + m^2)^k u(x))$, where the operator \diamond^k and $(\Delta + m^2)^k$ are Diamond operator and Helmholtz operator, respectively. n is the dimension of the Euclidean space \mathbb{R}^n , $x = (x_1, x_2, \dots, x_n) \in \mathbb{R}^n$, k is a nonnegative integer, $u(x)$ is an unknown and f is a given function. It is found that the existence of the solution $u(x)$ of such equation depending on the condition of f and $\Delta^{k-1} \square^k(\Delta + m^2)^k u(x)$ and moreover such solution $u(x)$ related to the wave equation and biharmonic equation depending on the conditions of p, q and k .

Key Words : *Diamond operator, Laplace operator, Helmholtz operator, Generalized functions.*

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