New Eigenmodes of Propagation in Quadratic Graded Index Media and Complex Fractional Fourier Transform

 FAN Hong-Yi [1,2] and FAN Yue [2]

[1] Department of Physics, Shanghai Jiao Tong University, Shanghai 200030, China
[2] Department of Material Science and Engineering, University of Science and Technology of China, Hefei 230026, China
(Received: 2002-6-4; Revised:)

Abstract: By introducing a convenient complex form of the α-th 2-dimensional fractional Fourier transform (CFFT) operation we find that it possesses new eigenmodes which are two-mode Hermite polynomials. We prove the eigenvalues of propagation in quadratic graded-index medium over a definite distance are the same as the eigenvalues of the α-th CFFT, which means that our definition of the α-th CFFT is physically meaningful.

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