

## New Exact Jacobi Elliptic Function Solutions of Three-Dimensional Nonlinear Helmholtz Equation in a Nonlinear Kerr-Type Medium

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**Abstract:** In this letter the three-dimensional nonlinear Helmholtz equation is investigated, which describes electromagnetic wave propagation in a nonlinear Kerr-type medium such that sixteen families of new Jacobi elliptic function solutions are obtained, by using our extended Jacobian elliptic function expansion method. When the modulus  $m \rightarrow 1$  or  $0$ , the corresponding solitary waves including bright solitons, dark solitons and new line solitons and singly periodic solutions can be also found.

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**Key words:** Jacobi elliptic function solution, Helmholtz equation, nonlinear Kerr-type medium

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