Analytical Study of Electromagnetic Wave in Superlattice

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Abstract: The theoretical description of soliton solutions and exact analytical solutions in the sine-Gordon equation is extended to superlattice physics. A family of interesting exact solutions and a new exact analytical solution have been obtained for the electromagnetic wave propagating through a superlattice. In more general cases, the vector potential along the propagating direction obeys the sine-Gordon equation. Some mathematical results of theoretical investigation are given for different cases in superlattices.

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