

## Exact Solutions of Discrete Sine-Gordon Equation

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**Abstract :** Two families of exact travelling solutions for the discrete sine-Gordon equation are constructed based on the variable-coefficient Jacobian elliptic function method and different transformations. When the modulus of Jacobian elliptic function solutions tends to 1, soliton solutions can be obtained. Some soliton solutions degenerate into the known solutions in literatures. Moreover, dynamical properties of exact solutions are investigated. Our analysis and results may have potential values for certain applications in modern nonlinear science and textile engineering.

**Keywords :** exact solutions, variable-coefficient Jacobian elliptic function method, discrete sine-Gordon equation, dynamical behaviors

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