Invariant difference schemes for sine-Gordon equations

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Abstract: In this paper, we consider invariant differential and present corresponding invariant difference equations which preserve the Lie group symmetries of the sine-Gordon equation. We present invariant difference schmes for the approximate solution of sine-Gordon equation which conserve uniformity and orthogonality of meshes.

have some powerful applications in physics and biology. A special case of this system, which describe the open states in DNA double helices is studied. Numerical solution of this system is obtained by finite difference method with fixed point iteration. Some examples are considered and the results of numerical experiments are presented.

Keywords: nonlinear boundary value problems, difference equations, numerical analysis

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