

Integrable semi-discretizations and self-adaptive moving mesh method for a generalized sine-Gordon equation

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In the present paper, integrable semi-discrete analogues in two different versions of a generalized sine-Gordon (sG) equation are constructed. The keys of the construction are the Bäcklund transformation of bilinear equations and appropriate definition of the discrete hodograph transformation. We construct N -soliton solutions for the semi-discrete analogue of the generalized sG equation in the form of Casorati determinant. In the continuous limit, we show that both versions of the semi-discrete generalized sG equation converge to the continuous generalized sG equation. Furthermore, both of two integrable semi-discretizations of the generalized sG equation are applied as integrable self-adaptive moving mesh (SAMM) methods in compared with a non-integrable SAMM method. This is a joint work with Baofeng Feng.