Hierarchy of Combined TL-RTL Equations and an Associated (2+1)-Dimensional Lattice Equation

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Abstract: A new (2+1)-dimensional lattice equation is presented based upon the first two members in the hierarchy of the combined Toda lattice and relativistic Toda lattice (TL-RTL) equations in (1+1) dimensions. A Darboux transformation for the hierarchy of the combined TL-RTL equations is constructed. Solutions of the first two members in the hierarchy of the combined TL-RTL equations, as well as the new (2+1)-dimensional lattice equation are explicitly obtained by the Darboux transformation.

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