**Nonlinear Sciences > Exactly Solvable and Integrable Systems**

# The multicomponent 2D Toda hierarchy: generalized matrix orthogonal polynomials, multiple orthogonal polynomials and Riemann--Hilbert problems

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We consider the relation of the multi-component 2D Toda hierarchy with matrix orthogonal and biorthogonal polynomials. The multi-graded Hankel reduction of this hierarchy is considered and the corresponding generalized matrix orthogonal polynomials are studied. In particular for these polynomials we consider the recursion relations, and for rank one weights its relation with multiple orthogonal polynomials of mixed type with a type II normalization and the corresponding link with a Riemann--Hilbert problem.

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*Which authors of this paper are endorsers?*