Nonlinear Sciences > Exactly Solvable and Integrable Systems

From KP/UC hierarchies to Painleve equations

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We study the underlying relationship between Painleve equations and infinite-dimensional integrable systems, such as the KP and UC hierarchies. We show that a certain reduction of these hierarchies by requiring homogeneity and periodicity yields Painleve equations, including their higher order generalization. This result allows us to clearly understand various aspects of the equations, e.g., Lax formalism, Hirota bilinear relations for tau-functions, Weyl group symmetry, and algebraic solutions in terms of the character polynomials, i.e., the Schur function and the universal character.

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