



Fredholm Determinants and Pole-free Solutions to the Noncommutative Painlevé II Equation

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Résumé en anglais	<p>We extend the formalism of integrable operators à la Its-Izergin-Korepin-Slavnov to matrix-valued convolution operators on a semi-infinite interval and to matrix integral operators with a kernel of the form $\frac{E_1^T(\lambda)}{E_2(\mu)\{\lambda+\mu\}}$, thus proving that their resolvent operators can be expressed in terms of solutions of some specific Riemann-Hilbert problems. We also describe some applications, mainly to a noncommutative version of Painlevé II (recently introduced by Retakh and Rubtsov) and a related noncommutative equation of Painlevé type. We construct a particular family of solutions of the noncommutative Painlevé II that are pole-free (for real values of the variables) and hence analogous to the Hastings-McLeod solution of (commutative) Painlevé II. Such a solution plays the same role as its commutative counterpart relative to the Tracy-Widom theorem, but for the computation of the Fredholm determinant of a matrix version of the Airy kernel.</p>
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