

# SIDE 14.2

## SIDE

Symmetries and Integrability  
of Difference Equations

Contribution ID : 68

# Entwinning Yang-Baxter maps and their extensions over Grassmann algebras

Monday 19 Jun 2023 at 12:00 (00h30')

### Content :

I will present certain birational maps that are solutions of the parametric entwining Yang-Baxter equation. These maps are obtained via the refactorisation problem of certain Darboux transformations associated with the Lax operators of certain soliton PDEs. I will also present various dynamical properties of the derived maps, such as existence of invariants and associated symplectic or Poisson structures, and I will prove their complete integrability in the Liouville sense, where possible. Then I will describe the generalisation of such maps over Grassmann algebras using refactorisation of products of supermatrices, i.e. Darboux transformations with bosonic and fermionic entries. I will use the analogue of the characteristic polynomial, which in this non-commutative setting is the characteristic function, to define an analogue of a spectral curve. The latter can be used to obtain invariants of these maps involving Grassmann variables. New higher dimensional commutative maps can be obtained fixing the order of the Grassmann algebra  $\Gamma(n)$  and I will discuss integrability properties of these derived commutative maps.

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**Session classification :** Yang-Baxter and tetrahedron equations

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