UNIVERSITÀ DEGLI STUDI DI MILANO

Time: **June, 11th (Wednesday), 2026**
14:30 (Rome, GMT+1)
Location: **Aula 12**
Veterinaria Edificio V1

Even Pfaff lattice and skew-orthogonal polynomials

Motivated by the theory of orthogonal random matrix ensembles, we investigate the integrable semi-discrete hierarchy of the Pfaff lattice. The focus on the even times of the hierarchy allows us to introduce the Even Pfaff lattice, similarly as the Volterra lattice can be deduced from the Toda lattice, the latter associated with the unitary random matrix ensemble. Via a map connecting Toda and Pfaff we explicitly determine the elements populating the Even Pfaff lattice at the initial time (with the Gauss weight). In [1] the initial datum provides the natural approach to construct the continuum limit, while also suggesting an interesting natural reduction of the system. The map exists at the level of the eigenfunctions of the semi-infinite Lax operator: orthogonal polynomials for Volterra and skew-orthogonal polynomials for Even Pfaff. In [2] we derive some closed relations for the skew-orthogonal polynomials for the Gauss weight, and determine the map and the modified three-term relations for the skew-orthogonal polynomials associated with the quartic Freud weight.
The talk is based on the work in collaboration with C. Benassi and A. Moro.

References

1 C. Benassi, M. Dell'Atti, A. Moro: Random matrix ensemble and integrable differential identities (2026), preprint on `arXiv:2504.11296 [math-ph]`.

2 C. Benassi, M. Dell'Atti: Skew-orthogonal polynomials for a quartic Freud weight: two classes of quasi-orthogonal polynomials (2026), preprint on `arXiv:2604.22616 [math.CA]`.

Marta Dell'Atti
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Marta Dell'Atti got a master in Theoretical Physics, then worked as a data analyst in Italy for 2 years. Then, she moved to the UK to undertake a PhD in Mathematics at Northumbria University, under the supervision of Antonio Moro. Dell'Atti has held post-doctoral positions at University of Kent, the University of Portsmouth, and the University of Warsaw. Dell'Atti's research interest is in the field of integrable systems with focus on the algebraic description via R-matrices, the geometric aspects of complex differential equations, and the Hamiltonian theory of PDEs and Hydrodynamic Systems.