

AROUND THE DE RHAM COMPLEX: THEORY, DISCRETIZATION, AND APPLICATIONS

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ABSTRACT

The aim of this minisymposium is to discuss the role of Hilbert complexes and related structure-preserving discretizations in the analysis, and implementation of high order and high performance numerical methods for low-frequency electromagnetic simulations and related PDEs.

We would like to cover a wide range of approaches: from methods well established in computational electromagnetism, like Whitney forms and finite element exterior calculus, discontinuous Galerkin or finite volume methods, to more recent approaches like polytopal methods, virtual element methods or isogeometric methods. Applications to other PDEs with geometric or topological structure, as well as computational aspects connected with structure preservation, such as domain decomposition, high-performance implementations, and model-reduction techniques, will also be considered.

SPEAKERS

1. Blanca Ayuso de Dios (Università degli Studi di Milano-Bicocca): tba.
2. Wietse M. Boon (University of Duisburg - Essen): tba.
3. Walter Boscheri (Université Savoie Mont Blanc and Università degli Studi di Ferrara): Asymptotic Preserving and divergence-free DG schemes for the ideal MHD equations.

4. Jessika Camaño (Universidad Católica de la Santísima Concepción): tba.
5. Snorre H. Christiansen (University of Oslo): tba.
6. Franco Dassi (Università degli Studi di Milano-Bicocca): Virtual elements for Maxwell's equations.
7. Michael Dumbser (Università di Trento): tba.
8. Andrea Dziubek (SUNY Polytechnic Institute): tba.
9. Jay Gopalakrishnan (Portland State University): Discretizations motivated by 2-complexes.
10. Johnny Guzmán (Brown University): Commuting projections satisfying discrete boundary conditions.
11. Marien Hanot (Université de Lille): tba.
12. Henar Herrero Sanz (Universidad de Castilla-La Mancha): A certified Reduced Order Model based on Legendre collocation for a Rayleigh-Bénard problem.
13. Anil Hirani (University of Illinois at Urbana-Champaign): Discrete wedge product, associativity and A-infinity structure.
14. Stefan Kurz (Bosch Center for Artificial Intelligence and ETH Zurich): When Maxwell becomes uncertain: a probabilistic de Rham complex for electrodynamics.
15. Martin Licht (Technical University of Dresden): tba.
16. Sanna Mönkölä (Sanna Mönkölä): Structure-preserving discretizations for wave propagation problems using discrete exterior calculus
17. Silvano Pitassi (Université de Montpellier): tba.
18. Karl O. Tyssvang (University of Oxford): Constructing de Rham complexes with finite element systems.
19. Rafael Vazquez Hernandez (Universidad de Santiago de Compostela): Fast conservative methods for the numerical resolution of Maxwell's equations in multipatch domains.
20. Enrico Zampa (University of Vienna): tba.