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## PERSONAL INFORMATION


# Rémi Abgrall

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## EDUCATION

- 1981-1985: Ecole Normale Supérieure de Saint Cloud (Mathematics).
  - 1984: "Agrégation", Mathematics (competitive french teaching degree, I was 8th for 128 positions).
  - 1982: Master in Pure Mathematics (University Paris XI, Orsay).
  - 1984: Graduate in Mechanics (University Paris VI).
- 1984-1987: PhD in Mechanics, University Paris VI (Advisor: C. Basdevant, Referees: O. Pironneau, M. Lesieur).
- 1995: Habilitation in Mathematics, University of Nice (Referees: S. Osher, J.P. Vila, A. Lerat).

## POSITIONS

- 2019-2024: International chair at Inria Bordeaux Sud-Ouest (commitment of 12 months over 5 years).
- 2015-2018: Invited professor at Xiamen University (China), one month/year
- 2014-today: Full professor, University of Zurich
- 2012-2016: William Penny fellow (Laboratory of Scientific Computing, Cambridge University and Atomic Weapon Agency, UK), i.e. scientific adviser at the Atomic Weapon Agency.
- 2012-2016: Scientific advisor at ONERA, France.
- 2008-2013: On leave at INRIA Bordeaux Sud-Ouest, France as Senior Researcher.
- 1996-2013: Professor University of Bordeaux I, then Institut Polytechnique de Bordeaux, France. (Promoted Full Professor in 2001, Distinguished Professor: 2008).
- 1988-1996: Research scientist at INRIA Sophia Antipolis, France.
- 1987-1988: Research engineer at ONERA, Châtillon sous Bagneux, France.
- 1985-1987: Assistant Professor in the Physics department (Ecole Normale Supérieure de la Rue d'Ulm, Paris, France).

## RESEARCH LINES

Numerical schemes for compressible fluid dynamics (high order schemes, multi-component and multi-phase flows, non conservative problems, steady and unsteady problems, uncertainty quantification), Hamilton Jacobi equations, level set techniques, unstructured meshes, curved meshes, model reduction technique for hyperbolic problems. For a complete list of publications, see `http://user.math.uzh.ch/abgrall/publis/`

## DISTINCTIONS

- 2025: Humboldt Research Award, Humboldt foundation, Germany
- 2024: Ludwig Prandlt medal of ECCOMAS
- 2024: I have been honored to have a special issue of *Computations on Applied Mathematics and Computations*, Volume 6(3), September 2024, for my 61 st birthday, see `https://link.springer.com/journal/42967/volumes-and-issues/6-3`.
- 2022: Elected SIAM Fellow
- 2014: Invited speaker, International Congress of Mathematics, Seoul. section: Numerical Analysis and Scientific Computing.
- 2008: European Research Council (advanced Grant ADDECCO, 2008-2013, Grant agreement No. 226316).
- 2001-2005: Junior member of Institut Universitaire de France.

– 2001: Prix Gamni-Smai of the French Academy of Sciences.

– 1990: 1st CRAY prize on scientific computing, with A. Dervieux, B. Larrouturou, H. Guillard, J.A Desideri and L. Fezoui.

## SELECTION OF INVITED CONFERENCES

– 2024:

  • Pleinary speaker, XIX International Conference on Hyperbolic Problems: Theory, Numerics, Applications, Shanghai Jiao Tong University, PR China July 1-5, 2024.
  • Pleinary speaker, "The International Conference on Mathematical Modeling and Numerical Methods", Beijing June 1-3, 2024
  • Pleinary speaker at CANUM 2024, France (May 27-31). It is the yearly conference of the french association of applied mathematics.
  • Pleinary speaker at the 2024 International Congress of Basic Science, Beijing, July 14-26.

– 2023:

  • Invited speaker at the Opening Workshop on the Recent Advances in Numerical Methods for Hyperbolic Conservation Laws, Shenzhen, China, December 5-15, 2023.
  • Pleinary speaker at "Finite Volumes for Complex Applications, (FCVA10, October 30-November 3rd, Strasbourg, France),
  • World Congress of IMACS (Roma, September 11-15),
  • "Numerical Aspects of Hyperbolic Balance Laws and Related Problems" (Cortona, Italy, June 19-23)
  • The 7th International Conference on Scientific Computing and Partial Differential Equations (SCPDE23, May 22-26, Hong Kong),

– 2021: Pleinary speaker at ICMMES 2021 (07/12-16, virtual) `https://www.icmmes.org/icmmes2021/`

– 2020: Invited speaker in the conference held in honor of the 60th birthday of G. Puppo (La Sapienza, Roma, 02/3-6). I also was invited to workshops in China (Shanghai, Shenzhen) that have been canceled because of the CORONA pandemics.

– 2019:

  • Invitation to CSE symposium at the University of Toronto during 05/21-22 (Future Challenges and Opportunities in Computational Science and Engineering)
  • Invited speaker at the 11th international conference on Scientific Computing and Applications, Xiamen (China), 05/27-30
  • I had to cancel invitations to the International Conference on Interface Problem in Fluid and Solid, June 18-21, 2019, South China Research Center for Applied Mathematics and Interdisciplinary Studies(CAMIS), South China Normal University, Guangzhou, China) and the 8th International Symposium on Physics of Fluids (ISPF8), which will be held in X'ian (China), 10-13 June 2019

– 2018: Conference in honour of Prof. P.L. Roe 80th birthday, 07/4-6, Cambrige (UK)

– 2017: Conference in honour of Prof. C.W. Shu 60th birthday, Brown University, 01/4-6.

– 2016: Plenary Speaker: XVI International Conference on Hyperbolic Problems: Theory, Numerics, Applications, Aachen (Germany), 08/1-5.

– 2015: Plenary speaker at:

  • European Conference on Numerical Mathematics and Advanced Applications (ENUMATH), Ankara (Turkey), 09/14-18.
  • International Conference on Numerical Mathematics and Scientific Computing, 08/16-19 in Nanjing, China. Satellite conference of the ICIAM
  • Applied Mathematics, Modelling and Computational Science (AMMCS) Congress and the annual meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), Waterloo, Canada, 06/7-10

– 2014: Plenary conference at the World Congress on Computational Mechanics conference (WCCM-ECCM-ECFD), Barcelona, 07/20-25.

– 2014: Invited conference at the International Congress of Mathematics, Seoul. section: Numerical Analysis and Scientific Computing.

– 2013: Clifford lectures at Tulane, 04/23.

– 2012: Plenary speaker at ICOSAHOM, Tunis, 06/25-29.

– 2010: Plenary speaker at the 7th International Conference on Computational Physics (ICCP7), Beijing, 05/17-20

## EDITORIAL DUTIES

– September 1st 2015-August 31th 2024: Editor in Chief of the Journal of Computational Physics.

– July 2011-August 2015: Co-editor in Chief of the International Journal on Numerical methods in Fluids.

– Associate editor of: Journal of Computational Physics (2003-August 2015), Mathematics of Computation (2010-2017), Journal of Scientific Computing (2007-today), Computers and Fluids (2001-today), Advances in Applied Mathematics (2008-today), Communication on Applied Mathematics and Computation (2018-today), M2AN (2002-2008), Communication in Computational Physics (2017-today), M3AS (2020-today), M3AS (2019-today). Collections: Mathématiques et Application (Springer), Series in Applied and Numerical Mathematics (de Gruyter, 2017-today), Science China (2023-). Senior editor of MATCOM (2021-).

## GRANT HISTORY

*The total amount of funding is 2,285 KCHF in Switzerland, 3,532 K€ in France and about 480 KF (i.e. about 73 K€ before 2002 when the EURO became the European money.)*

– Switzerland

- Foundation Emeritus, 09/2023-09/2024: Structure preserving schemes, 50 000 CHF
- SNF, December 2021-November 2025: "Structure preserving and fast methods for hyperbolic systems of conservation laws", 480 KCHF. Kinetic schemes, structure preserving schemes for compressible fluids.
- SNF, December 2017-November 2021:"Solving advection dominated problems with high order schemes with polygonal meshes: application to compressible and incompressible flow problems", 755 KCHF. Schemes for polygonal meshes, high order Residual distribution scheme for unsteady problems.
- SNF,September 2014-August 2018: "High fidelity simulation for compressible material": Lagrangian schemes, model order reduction for compressible flows. 700 KCHF
- ITN ModCompShock (2016-2020). I was part of the Zürich node and will be involved in meshing activities, in part with ONERA and Dassault. 150 KCHF
- within the Norvegian CCS research center ($CO_2$ capture): development of numerical methodology for multiphase flows in pipes, 150 KCHF

– France

- Project MECASIF (2013-2016), Topic: Model reduction for fluid mechanics, in collaboration with Dassault Aviation. Role PI for INRIA, 130 K€.
- Agence Nationale de la FUI grant, France Recherche (ANR): “Adaptive mesh refinement for unsteady interfaces with deformation, stretching and curvature” (MAIDESC). Grant obtained in June 2013, 3 years. Role co-PI in Bordeaux (with C. Dobrzynski). Topic: mesh generation for high order schemes. 100 K€
- TRP ESA funding “Uncertainty Quantification for Aerospace Applications”, April 1st 2012-March 31, 2014. partner : VKI (PI), INRIA, EADS ASTRIUM, HTG-HST (Germany). 50 K€. I was PI for the Bacchus INRIA team.
- Paralgo-Rhodia research contract: december 1st-march 31 2012: development of a 1D CFD tool for multiphase bubbly flows with solid traces (preliminary study). 12 K€. Role: PI
- OSEO (french funding for R&D work related to industry) grant within the Competitivity cluster AESE "SONATE". Budget of several million of Euros. Our part is 162 000 €, 2012-2015. The PI was E. Chaput from AIRBUS France. My project was, in collaboration with ONERA, to develop a CFD plateform for aerodynamics applications with high level numerical schemes and able to work on NUMA architecture (chips of CPUs and GPUs) without having the need to recode everything when the chips architecture are changed. This project involves computer scientists and use the StarPU library `http://runtime.bordeaux.inria.fr/StarPU/`. Role: PI for INRIA.
- Agence Nationale de la Recherche (ANR) grant : 2011-2014. “Uncertainty quantification For compressible fluid dynamics and Optimisation”, Role: PI of the grant. Partners: ONERA, ENSAM, INPG (Grenoble), Phimeca (french SME). Funding: 804 K €, PI.
- **European Research Council Advanced Research Grant ADDECCO “Adaptative Schemes for Deterministic and Stochastic Flow problems”, grant agreement # 226316, 12/2008-11/2013. funding : 1,432,769 €. Role : PI**
- European Union FP7 STREP “IDHIOM”, 2010-2013, funding: €185,000. Role PI for the INRIA activities (15 European partners like AIRBUS, ONERA, DLR, etc). Theme: high order schemes for turbulent application in aerospace engineering.
- European Union FP6 STREP “ADIGMA”, 2006-2009, funding: €150,000, role : PI for the INRIA activities (22 European partners like AIRBUS, ONERA, DLR, etc ). Theme: high order schemes for compressible fluid dynamics.
- CNES grant, 2002-2005, high order schemes developments for compressible flows funding: €150,000. Role : PI
- SNECMA industrial contract 2008-2011. Funding: €170,000. Role : PI. transfert of CFD knowledge to a subcontractor.
- Agence Nationale de la Recherche (ANR) grant : 2006-2009. Funding: €170,000. Role: co-PI. Partners: INRIA and CEA Cadarache. Theme: simulation of MHD flows in tokamaks.
- Research contract with the French Atomic Agency, 2011. Funding €10,000. Role: PI
- 2002: Competivity cluster AESE projet “MACAO”, coupling of two codes using either unstructured meshes and structured meshes. Funding €150,000. Role PI for INRIA activities.
- Prior to 2002: Several research contract with the French Atomic Agency. Total funding about €100,000. Role PI.
- 2000: French ministry of research grant in the INCA program. Funding €42,000. Role: PI for INRIA activities (3 partners).

- 1997–1998: Research project between France and Belgium (Action Intégrée Tournesol) with Pr. H. Deconinck, von Kàrman Institute, Theme :"Genuinely multiD schemes for fluid mechanics" 50 KF
- 1997, 1998, 1999, 2000: research contacts with SNPE St Médard en Jalles (now part of SNECMA); "computation of a front flame in a non homogeneous medium", budget 50 KF HT/year, PI
- 1998, 1999: Research contact with CEA-DAM (CESTA): " Developping cell centered numerical methods using multibloc meshes for compressible viscous flows".
- 2000–2003: Research contract with CEA-CESTA. «Residual distribution schemes».100 KF/year
- 2000–2003: Research contract with CEA-CESTA. «Regularised PIC methods»30 KF/year
- 2000–2003: Research contract with CEA-CESTA. «Study of the Schödinger equation with large wave spectrum, numerical method» with T. Colin (U. Bordeaux) 70 KF/year
- 2000: Research contact with CEA Saclay on the interaction of a Laser with an Uranium gas with Th Colin and B. Nkonga (both U. Bordeaux) 200 K.
- 2001–2004: Research contact with CEA-CESTA on numerical methods for high Mach number multiphase flows, 30K/year

When I was at Inria Sophia Antipolis (1988-1996), I have been involved in the Hermes project. The project was to build a European space shuttle, it has been canceled in the 1990's. At Inria, we were asked to elaborate specific schemes to compute hypersonic flows, for me nozzle flows. I was not a PI, nor a co-PI for Inria. But I worked a lot on the science problem, on the organisation of several workshops. I have been one of the co-organisors of the second and third workshops "Hypersonic Flows for Reentry Problems" (Antibes, France, April 1991 and January 1993), withJ. A. Désideri, M. Mallet, R. Glowinski et J. Périaux. I am one of the editors of the third volume of the proceedings of this series of workshops ( *Proceedings of a Workshop on Hypersonic Flows for Reentry Problems* , volumes I, II et III, Springer Verlag).

## STUDENTS

*The names with boldface character currently hold positions in Academia, CNRS, INRIA, or National Labs.*

– Master students about 10, 4 at UZH. The 4 at UZH are now working either as High school teachers or in Industry. I have no idea of the one at the University of Bordeaux, except those who started a PhD with me, i.e. most of my PhD students in Bordeaux.

– PhD students

- D. Chargy, co-advised with B. Larrouturou, L. Fezoui. Defended on June 1991. Last position known: head of division Numerical fluid dynamics of SIMULOG (Industry), now ASTEK Group.
- A. Merlo, defended in March 1994. Last position known: engineer at SIMULOG (now ASTEK Group)
- T. Lumpp , co-advised with R. Peyret, H. Guillard. Defended in October 1994. Last position known: Assistant Professor at ETH Zürich.
- S. Augoula, defended in Deceber 2000. He has created a business in Research and Development. Deceased since 6 years. item L. Gozalo, at ONERA. Defended on December 2000, research scientist at CEA, Military division.
- M. Mezine, defended on December 2002. Currently research engineer at NUMECA International (Belgium).
- **R. Loubère**, defended on December 2002. Currently research director at CNRS in the Mathematics department of the University of Bordeaux, France
- K. Barrailh, Defended in September 2002. Future: unknown.
- M. Papin, defended in September 2002. Currently research engineer at Lectra, CESTAS, France.
- **V. Perrier**, defended on December 2006, now research director at INRIA (research director, as associate professor)
- C. Tavé, defended on December 2007, engineer at EDF (largest french energy producer)
- **François Vilar**, Tenured assistant professor at the University of Montpellier, France
- **Adam Larat**, now research scientist at CNRS (Grenoble, France)
- Dante de Santis (comes from Politechnico de Milano), defended in December 2013. Currently research engineer at NRG, the nederlands.
- **Gianluca Geraci**, (comes from Politechnico de Milano), defended in December 2013. Staff at SANDIA (Albuquerque)
- Algyiane Froehly, Defended in September 2013, research engineer in a startup of Inria (Meshing problems)
- Roxana Crisovan, Defended in December 2017, now head of the group developing tools for card fraud detection at the bank UBS in Zürich
- **Davide Torlo**, Defended in December 2019, now Assistant professor at the University of Roma I (Italy).
- Paola Bacigaluppi, Defended in December 2017, now Industry in Milano (Italy)
- Elise Le Mélédo, Defended in September 2021, research engineer at Thales, France
- **Maria Han Veiga**, defended in January 2020, Assistant professor at Ohio State University.
- Fatemeh Nassajian Mojarrad, Defended in March 2023, postdoc (Data science) at the University of Geneva, Switzerland)
- Lorenzo Miccalizi, Defended in December 2023, currently postdoc at North Carolina State University, Raleigh, NC.

– Postdocs

- M. Mezine, now research engineer at NUMECA International (Belgium)
- **M.G. Rodio**: now head of a research group at CEA (Nuclear Energy direction, Paris area, France).
- **Tulin Kaman**, now associate professor at the University of Arkansas, Fayetteville, AR
- **S. Tokareva**: now staff at Los Alamos National Labs
- **W. Barsukow**, now research scientist at CNRS, Department of Mathematics, University of Bordeaux, France
- **Philipp Oeffner** now Professor (W3) at TU Clauserthal, Germany.
- Gauthier Wissocq, now: research engineer at CEA, France
- Current postdocs: Nikita Afanasiev, Yongle Liu.

## COMITTEES, SYNERGISTIC ACTIVITIES: SELECTION

– I have been vice-head and then head of the hiring comitee (applied math) at the university of Bordeaux (before 2000, and after).

– I have been Director of the applied math CNRS laboratory (UMR 5466) between 2001 and 2004. This unit has merged into the Institute of Mathematics of Bordeaux in 2004.

– From 2008 to 2013, I was the head of the Inria team Bacchus (4 permanent Inria researchers, 2 assistant professors of the University of Bordeaux), and several PhDs and Postdocs. All my research contract during that period where put in this group, and all my PhDs/postdoc were member of that group.

– I have been member of the "Comité National des Universités" (2003-2007, promotion of professors), of the National committee of CNRS (2008-2012), France. (hiring and promotion of CNRS researchers)

– I was member of the scientific council of CERFACS, France (2005-2020)[1].

– Since 2018, I am member of the Scientific committee of the Military Division of CEA (CEA-DAM).

– Since 2014, I am councillor of the Swiss National Science Foundation, division 2 (grant evaluation, some academic positions are funded by SNSF), this position will go until April 2025.

– Between 2016 and 2020, I have been member of the research commission of the Faculty of Science of the University of Zurich.

– I have been responsible of GAMNI-SMAI in France, a working group of the french SIAM,

– then treasurer of ECCOMAS (2013-2017)[2],

– I am a founding member (with J.F. Molinari and A. Abdule, EPFL) of Swicomas (Swiss chapel of ECCOMAS).

– In 2017, I was member of the scientific committee of the SIAM-CSE conference in Atlanta. I am member of the scientific committee of the International Conference on Numerical Methods for Multi-Material Fluid Flow (MULTIMAT). This conference gather scientis form National Labs in the US, CEA, AWE.

– Since 2023, I am also member of the Executive board of the ICCFD conference (International Conference on Fluid Dynamics).

– In 2023, I am a member of the scientific committee of "The 2024 International Conference on Hyperbolic Problems: Theory, Numerics, and Applications (HYP2024)", to be held at Shanghai Jiao Tong University, Shanghai, China, on July 1-5, 2024

– In 2024, I have been member of the International Conference on Basic Science Frontiers of Science Award - Selection Committee, Scientific Computing.

With P. Chinesta (ENSAM, France) and O. Allix (ENS Paris-Saclay, France), I was co-chairman of the organisation of the World Congress on Computational Mechanics Conference (WCCM 2020) which was held online in Paris in 1/11-15 2021 ($\approx$ 3500 participants). I was vice-chairman for Fluid Mechanics.
I have co-organised several smaller meetings. A selection of recent activities is:

– February 25-March 1st, 2024, (together with M. Garavello (Milano), M. Lukacova (Mainz), K. Trivisa (College Park) in Oberwolfach: Hyperbolic Balance Laws: modelling, analysis, and numerics.

– in August 2022, MULTIMAT (10th International Conference on Numerical Methods for Multi-Material Fluid Flow) in Zürich. About 150 particpants are expected from National Labs (US, France, Russia, China, UK).

– 28 Feb - 6 Mar 2021 (together with M. Garavello (Milano), M. Lukacova (Mainz), K. Trivisa (College Park) in Oberwolfach: Hyperbolic Balance Laws: modelling, analysis, and numerics (hybrid meeting)

– in 2017 (together with P. Sidhartha Mishra, ETH), NUMHYP17, May 28th-June 2nd, `https://www.math.uzh.ch/nmhp17/index.php?id=26`

[1] `https://cerfacs.fr/en/home/`
[2] `https://www.eccomas.org/`

– in 2015 (together with Pr. Th. Sonar (Braunchweig) and A. Meister(Munster)) in Oberwolfach "Recent developments in the numerics of hyperbolic conservation laws",

– in 2024, 2019, 2017, 2015, 2013: together with Pr. M. Dumbser (Trento), C.D. Munz (Stuttgart) and T. Toro (Trento). we have organised HONOM (European Workshop on High Order Nonlinear Numerical Methods for Evolutionnary PDEs: Theory and Applications) in Madrid, Stuttgart, Trento, Bordeaux, Braga (Portugal). In Bordeaux, I was the main organiser. The next one should be in Trento, Italy.

## BIBLIOGRAPHY

# Journal papers


[1] Rémi Abgrall, Stéphane Del Pino, Axelle Drouard, and Emmanuel Labourasse. "Extension to non-uniform meshes of a high order computationally explicit kinetic scheme for hyperbolic conservation laws". English. In: *Comput. Fluids* 297 (2025). Id/No 106648, p. 21.

[2] Giuseppe Sirianni, Alberto Guardone, Barbara Re, and Rémi Abgrall. "An explicit primitive conservative solver for the Euler equations with arbitrary equation of state". English. In: *Comput. Fluids* 279 (2024). Id/No 106340, p. 21.

[3] Gauthier Wissocq, Yongle Liu, and Rémi Abgrall. "A positive- and bound-preserving vectorial lattice Boltzmann method in two dimensions". In: *SIAM J. Scientific Computing* (2025). Preprint, arXiv:2411.15001 [math.NA] (2024).

[4] Rémi Abgrall, Wasilij Barsukow, and Christian Klingenberg. "A semi-discrete active flux method for the Euler equations on Cartesian grids". English. In: *J. Sci. Comput.* 102.2 (2025). Id/No 36, p. 41.

[5] Ruifang Yan, Rémi Abgrall, and Kailiang Wu. "Uniformly high-order bound-preserving OEDG schemes for two-phase flows". English. In: *Math. Models Methods Appl. Sci.* 34.13 (2024), pp. 2537–2610.

[6] Rémi Abgrall and Yongle Liu. "A new approach for designing well-balanced schemes for the shallow water equations: a combination of conservative and primitive formulations". English. In: *SIAM J. Sci. Comput.* 46.6 (2024), a3375–a3400.

[7] Gauthier Wissocq and Rémi Abgrall. "A new local and explicit kinetic method for linear and non-linear convection-diffusion problems with finite kinetic speeds. I: One-dimensional case". English. In: *J. Comput. Phys.* 518 (2024). Id/No 113333, p. 29.

[8] Gauthier Wissocq and Rémi Abgrall. "A new local and explicit kinetic method for linear and non-linear convection-diffusion problems with finite kinetic speeds. II: Multi-dimensional case". English. In: *J. Comput. Phys.* 516 (2024). Id/No 113376, p. 27.

[9] Rémi Abgrall and Fatemeh Nassajian Mojarrad. "An arbitrarily high order and asymptotic preserving kinetic scheme in compressible fluid dynamic". English. In: *Commun. Appl. Math. Comput.* 6.2 (2024), pp. 963–991.

[10] Lorenzo Micalizzi, Mario Ricchiuto, and Rémi Abgrall. "Novel well-balanced continuous interior penalty stabilizations". English. In: *J. Sci. Comput.* 100.1 (2024). Id/No 14, p. 45.

[11] François Vilar and Rémi Abgrall. "A posteriori local subcell correction of high-order discontinuous Galerkin scheme for conservation laws on two-dimensional unstructured grids". English. In: *SIAM J. Sci. Comput.* 46.2 (2024), a851–a883.

[12] Remi Abgrall. "Staggered schemes for compressible flow: a general construction". English. In: *SIAM J. Sci. Comput.* 46.1 (2024), a399–a428.

[13] Giuseppe Sirianni, Barbara Re, Remi Abgrall, and Alberto Guardone. "Momentum weighted interpolation for unsteady weakly compressible two-phase flows on unstructured meshes". English. In: *J. Comput. Appl. Math.* 428 (2023). Id/No 115209, p. 17.

[14] Rémi Abgrall, Mária Lukáčova-Medvid'ová, and Philipp Öffner. "On the convergence of residual distribution schemes for the compressible Euler equations via dissipative weak solutions". English. In: *Math. Models Methods Appl. Sci.* 33.1 (2023), pp. 139–173.

[15] Sixtine Michel, Davide Torlo, Mario Ricchiuto, and Rémi Abgrall. "Spectral analysis of high order continuous FEM for hyperbolic PDEs on triangular meshes: influence of approximation, stabilization, and time-stepping". English. In: *J. Sci. Comput.* 94.3 (2023). Id/No 49, p. 48.

[16] R. Abgrall, J. Nordström, P. Öffner, and S. Tokareva. "Analysis of the SBP-SAT stabilization for finite element methods. II: Entropy stability". English. In: *Commun. Appl. Math. Comput.* 5.2 (2023), pp. 573–595.

[17] Rémi Abgrall and Maria Han Veiga. "Neural network-based limiter with transfer learning". English. In: *Commun. Appl. Math. Comput.* 5.2 (2023), pp. 532–572.

[18] Remi Abgrall and Wasilij Barsukow. "Extensions of active flux to arbitrary order of accuracy". English. In: *ESAIM, Math. Model. Numer. Anal.* 57.2 (2023), pp. 991–1027.

[19] Rémi Abgrall and Wasilij Barsukow. "A hybrid finite element-finite volume method for conservation laws". English. In: *Appl. Math. Comput.* 447 (2023). Id/No 127846, p. 11.

[20] Rémi Abgrall, Saray Busto, and Michael Dumbser. "A simple and general framework for the construction of thermodynamically compatible schemes for computational fluid and solid mechanics". English. In: *Appl. Math. Comput.* 440 (2023). Id/No 127629, p. 40.

[21] Rémi Abgrall, Pratik Rai, and Florent Renac. "A discontinuous Galerkin spectral element method for a non-conservative compressible multicomponent flow model". English. In: *J. Comput. Phys.* 472 (2023). Id/No 111693, p. 31.

[22] R. Abgrall. "A combination of residual distribution and the active flux formulations or a new class of schemes that can combine several writings of the same hyperbolic problem: application to the 1D Euler equations". English. In: *Commun. Appl. Math. Comput.* 5.1 (2023), pp. 370–402.

[23] M. Petrella, R. Abgrall, and S. Mishra. "On the discrete equation model for compressible multiphase fluid flows". English. In: *J. Comput. Phys.* 478 (2023). Id/No 111974, p. 38.

[24] Paola Bacigaluppi, Rémi Abgrall, and Svetlana Tokareva. ""*A posteriori*" limited high order and robust schemes for transient simulations of fluid flows in gas dynamics". English. In: *J. Comput. Phys.* 476 (2023). Id/No 111898, p. 34.

[25] Rémi Abgrall, Élise Le Mélédo, Philipp Öffner, and Davide Torlo. "Relaxation deferred correction methods and their applications to residual distribution schemes". English. In: *SMAI J. Comput. Math.* 8 (2022), pp. 125–160.

[26] Rémi Abgrall and Fatemeh Nassajian Mojarrad. "Conservative scheme compatible with some other conservation laws: conservation of the local angular momentum". English. In: *Comput. Fluids* 247 (2022). Id/No 105663, p. 15.

[27] Jianfang Lin, Yupeng Ren, Rémi Abgrall, and Jianxian Qiu. "High order residual distribution conservative finite difference HWENO scheme for steady state problems". English. In: *J. Comput. Phys.* 457 (2022). Id/No 111045, p. 21.

[28] Rémi Abgrall, Philipp Öffner, and Hendrik Ranocha. "Reinterpretation and extension of entropy correction terms for residual distribution and discontinuous Galerkin schemes: application to structure preserving discretization". English. In: *J. Comput. Phys.* 453 (2022). Id/No 110955, p. 24.

[29] Rémi Abgrall and Davide Torlo. "Some preliminary results on a high order asymptotic preserving computationally explicit kinetic scheme". English. In: *Commun. Math. Sci.* 20.2 (2022), pp. 297–326.

[30] Paola Bacigaluppi, Julien Carlier, Marica Pelanti, Pietro Marco Congedo, and Rémi Abgrall. "Assessment of a non-conservative four-equation multiphase system with phase transition". English. In: *J. Sci. Comput.* 90.1 (2022). Id/No 28, p. 28.

[31] Ronit Kumar, Lidong Cheng, Yunong Xiong, Bin Xie, Rémi Abgrall, and Feng Xiao. "THINC scaling method that bridges VOF and level set schemes". English. In: *J. Comput. Phys.* 436 (2021). Id/No 110323, p. 26.

[32] Sixtine Michel, Davide Torlo, Mario Ricchiuto, and Rémi Abgrall. "Spectral analysis of continuous FEM for hyperbolic PDEs: influence of approximation, stabilization, and time-stepping". English. In: *J. Sci. Comput.* 89.2 (2021). Id/No 31, p. 41.

[33] Rémi Abgrall, Élise Le Mélédo, and Philipp Öffner. "General polytopal $H(\mathrm{div})$-conformal finite elements and their discretisation spaces". English. In: *ESAIM, Math. Model. Numer. Anal.* 55 (2021), pp. 677–704.

[34] Rémi Abgrall. "The notion of conservation for residual distribution schemes (or fluctuation splitting schemes), with some applications". English. In: *Commun. Appl. Math. Comput.* 2.3 (2020), pp. 341–368.

[35] R. Abgrall, J. Nordström, P. Öffner, and S. Tokareva. "Analysis of the SBP-SAT stabilization for finite element methods. I: Linear problems". English. In: *J. Sci. Comput.* 85.2 (2020). Id/No 43, p. 28.

[36] Rémi Abgrall and Davide Torlo. "High order asymptotic preserving deferred correction implicit-explicit schemes for kinetic models". English. In: *SIAM J. Sci. Comput.* 42.3 (2020), b816–b845.

  

[37] Hennes Hajduk, Dmitri Kuzmin, Tzanio Kolev, and Remi Abgrall. "Matrix-free subcell residual distribution for Bernstein finite element discretizations of linear advection equations". English. In: *Comput. Methods Appl. Mech. Eng.* 359 (2020). Id/No 112658, p. 26.

[38] Rémi Abgrall, Konstantin Lipnikov, Nathaniel Morgan, and Svetlana Tokareva. "Multidimensional staggered grid residual distribution scheme for Lagrangian hydrodynamics". English. In: *SIAM J. Sci. Comput.* 42.1 (2020), a343–a370.

[39] Maria Han Veiga, David A. Velasco-Romero, Rémi Abgrall, and Romain Teyssier. "Capturing near-equilibrium solutions: a comparison between high-order discontinuous Galerkin methods and well-balanced schemes". English. In: *Commun. Comput. Phys.* 26.1 (2019), pp. 1–34.

[40] Rémi Abgrall, Paola Bacigaluppi, and Svetlana Tokareva. "High-order residual distribution scheme for the time-dependent Euler equations of fluid dynamics". English. In: *Comput. Math. Appl.* 78.2 (2019), pp. 274–297.

[41] Jianfang Lin, Rémi Abgrall, and Jianxian Qiu. "High order residual distribution for steady state problems for hyperbolic conservation laws". English. In: *J. Sci. Comput.* 79.2 (2019), pp. 891–913. URL: www.zora.uzh.ch/id/eprint/162046/1/abgrall_highorderresiducalsteadystate.pdf.

[42] R. Crisovan, D. Torlo, R. Abgrall, and S. Tokareva. "Model order reduction for parametrized nonlinear hyperbolic problems as an application to uncertainty quantification". English. In: *J. Comput. Appl. Math.* 348 (2019), pp. 466–489. URL: www.zora.uzh.ch/id/eprint/162044/1/abgrall_modelorder.pdf.

[43] R. Abgrall. "A general framework to construct schemes satisfying additional conservation relations. Application to entropy conservative and entropy dissipative schemes". English. In: *J. Comput. Phys.* 372 (2018), pp. 640–666. URL: www.zora.uzh.ch/id/eprint/157549/1/abgrall_ageneralframework.pdf.

[44] Rémi Abgrall. "Some remarks about conservation for residual distribution schemes". English. In: *Comput. Methods Appl. Math.* 18.3 (2018), pp. 327–351. URL: www.zora.uzh.ch/id/eprint/144802/1/Abgrall_someremarks.pdf.

[45] R. Abgrall, P. Bacigaluppi, and S. Tokareva. "A high-order nonconservative approach for hyperbolic equations in fluid dynamics". English. In: *Comput. Fluids* 169 (2018), pp. 10–22. URL: www.zora.uzh.ch/id/eprint/139873/1/abgrall_highorder_nonconservative.pdf.

[46] R. Abgrall, P. M. Congedo, and G. Geraci. "Towards a unified multiresolution scheme for treating discontinuities in differential equations with uncertainties". English. In: *Math. Comput. Simul.* 139 (2017), pp. 1–22.

[47] R. Abgrall. "High order schemes for hyperbolic problems using globally continuous approximation and avoiding mass matrices". English. In: *J. Sci. Comput.* 73.2-3 (2017), pp. 461–494.

[48] Rémi Abgrall, Q. Viville, H. Beaugendre, and C. Dobrzynski. "Construction of a $p$-adaptive continuous residual distribution scheme". English. In: *J. Sci. Comput.* 72.3 (2017), pp. 1232–1268.

[49] Rémi Abgrall and Svetlana Tokareva. "Staggered grid residual distribution scheme for Lagrangian hydrodynamics". English. In: *SIAM J. Sci. Comput.* 39.5 (2017), a2317–a2344.

[50] L. Nouveau, H. Beaugendre, C. Dobrzynski, R. Abgrall, and M. Ricchiuto. "An adaptive, residual based, splitting approach for the penalized Navier Stokes equations". English. In: *Comput. Methods Appl. Mech. Eng.* 303 (2016), pp. 208–230.

[51] G. Geraci, P. M. Congedo, R. Abgrall, and G. Iaccarino. "High-order statistics in global sensitivity analysis: decomposition and model reduction". English. In: *Comput. Methods Appl. Mech. Eng.* 301 (2016), pp. 80–115. URL: www.zora.uzh.ch/id/eprint/124869/1/document.pdf.

[52] Birte Schmidtmann, Rémi Abgrall, and Manuel Torrilhon. "On third-order limiter functions for finite volume methods". English. In: *Bull. Braz. Math. Soc. (N.S.)* 47.2 (2016), pp. 753–764.

[53] Kunkun Tang, Pietro M. Congedo, and Rémi Abgrall. "Adaptive surrogate modeling by ANOVA and sparse polynomial dimensional decomposition for global sensitivity analysis in fluid simulation". English. In: *J. Comput. Phys.* 314 (2016), pp. 557–589.

[54] Gianluca Geraci, Pietro Marco Congedo, Rémi Abgrall, and Gianluca Iaccarino. "A novel weakly-intrusive non-linear multiresolution framework for uncertainty quantification in hyperbolic partial differential equations". English. In: *J. Sci. Comput.* 66.1 (2016), pp. 358–405.

[55] Jiřı Dobeš, Mario Ricchiuto, Rémi Abgrall, and Herman Deconinck. "On hybrid residual distribution-Galerkin discretizations for steady and time dependent viscous laminar flows". English. In: *Comput. Methods Appl. Mech. Eng.* 283 (2015), pp. 1336–1356.

  

[56] Kunkun Tang, Pietro M. Congedo, and Rémi Abgrall. "Sensitivity analysis using anchored ANOVA expansion and high-order moments computation". English. In: *Int. J. Numer. Methods Eng.* 102.9 (2015), pp. 1554–1584. URL: hal.inria.fr/hal-00987189/file/RR-8531.pdf.

[57] R. Abgrall, P. M. Congedo, G. Geraci, and M. G. Rodio. "Stochastic discrete equation method (SDEM) for two-phase flows". English. In: *J. Comput. Phys.* 299 (2015), pp. 281–306.

[58] R. Abgrall and D. De Santis. "Linear and non-linear high order accurate residual distribution schemes for the discretization of the steady compressible Navier-Stokes equations". English. In: *J. Comput. Phys.* 283 (2015), pp. 329–359.

[59] L. Arpaia, M. Ricchiuto, and R. Abgrall. "An ALE formulation for explicit Runge-Kutta residual distribution". English. In: *J. Sci. Comput.* 63.2 (2015), pp. 502–547.

[60] R. Abgrall, C. Dobrzynski, and A. Froehly. "A method for computing curved meshes via the linear elasticity analogy, application to fluid dynamics problems". English. In: *Int. J. Numer. Methods Fluids* 76.4 (2014), pp. 246–266.

[61] M. G. Rodio, P. M. Congedo, and R. Abgrall. "Two-phase flow numerical simulation with real-gas effects and occurrence of rarefaction shock waves". English. In: *Eur. J. Mech., B, Fluids* 45 (2014), pp. 20–35.

[62] R. Abgrall, P. M. Congedo, D. De Santis, and N. Razaaly. "A non-linear residual distribution scheme for real-gas computations". English. In: *Comput. Fluids* 102 (2014), pp. 148–169.

[63] R. Abgrall and M. G. Rodio. "Discrete equation method (DEM) for the simulation of viscous, compressible, two-phase flows". English. In: *Comput. Fluids* 91 (2014), pp. 164–181.

[64] Pascal Jacq, Pierre-Henri Maire, and Rémi Abgrall. "A nominally second-order cell-centered finite volume scheme for simulating three-dimensional anisotropic diffusion equations on unstructured grids". English. In: *Commun. Comput. Phys.* 16.4 (2014), pp. 841–891. URL: www.zora.uzh.ch/id/eprint/154534/1/ZORA_NL_154534.pdf.

[65] Remi Abgrall and Harish Kumar. "Numerical approximation of a compressible multiphase system". English. In: *Commun. Comput. Phys.* 15.5 (2014), pp. 1237–1265. URL: www.zora.uzh.ch/id/eprint/99163/1/new.pdf.

[66] François Vilar, Pierre-Henri Maire, and Rémi Abgrall. "A discontinuous Galerkin discretization for solving the two-dimensional gas dynamics equations written under total Lagrangian formulation on general unstructured grids". English. In: *J. Comput. Phys.* 276 (2014), pp. 188–234. URL: www.zora.uzh.ch/id/eprint/147693/1/abgrall_adiscontinuous_Galerkin.pdf.

[67] G. I. Jennings, D. Prigge, S. Carney, S. Karni, J. B. Rauch, and R. Abgrall. "Water wave propagation in unbounded domains. II: Numerical methods for fractional PDEs". English. In: *J. Comput. Phys.* 275 (2014), pp. 443–458.

[68] Dinshaw S. Balsara, Michael Dumbser, and Remi Abgrall. "Multidimensional HLLC Riemann solver for unstructured meshes – with application to Euler and MHD flows". English. In: *J. Comput. Phys.* 261 (2014), pp. 172–208. URL: www.zora.uzh.ch/id/eprint/147696/1/abgrall_multidimensionalHLLC.pdf.

[69] R. Abgrall, H. Beaugendre, and C. Dobrzynski. "An immersed boundary method using unstructured anisotropic mesh adaptation combined with level-sets and penalization techniques". English. In: *J. Comput. Phys.* 257 (2014), pp. 83–101. URL: hal.inria.fr/hal-00786853/file/RR-88228.pdf.

[70] R. Abgrall, P. M. Congedo, and G. Geraci. "A one-time truncate and encode multiresolution stochastic framework". English. In: *J. Comput. Phys.* 257 (2014), pp. 19–56. URL: hal.inria.fr/hal-00699026/file/RR-7967.pdf.

[71] Remi Abgrall and Harish Kumar. "Robust finite volume schemes for two-fluid plasma equations". English. In: *J. Sci. Comput.* 60.3 (2014), pp. 584–611. URL: www.zora.uzh.ch/id/eprint/147700/1/abgrall_robustfinite_volumeschmemes.pdf.

[72] R. Abgrall, D. De Santis, and M. Ricchiuto. "High-order preserving residual distribution schemes for advection-diffusion scalar problems on arbitrary grids". English. In: *SIAM J. Sci. Comput.* 36.3 (2014), a955–a983.

[73] Z. J. Wang, Krzysztof Fidkowski, Rémi Abgrall, Francesco Bassi, Doru Caraeni, Andrew Cary, Herman Deconinck, Ralf Hartmann, Koen Hillewaert, H. T. Huynh, Norbert Kroll, Georg May, Per-Olof Persson, Bram van Leer, and Miguel Visbal. "High-order CFD methods: current status and perspective". English. In: *Int. J. Numer. Methods Fluids* 72.8 (2013), pp. 811–845. URL: hdl.handle.net/2027.42/98401.

[74] Rémi Abgrall and Arnaud Krust. "An adaptive enrichment algorithm for advection-dominated problems". English. In: *Int. J. Numer. Methods Fluids* 72.3 (2013), pp. 359–374. URL: hal.inria.fr/hal-00665524/file/RR_7866.pdf.

[75] R. Abgrall, G. Baurin, A. Krust, D. De Santis, and M. Ricchiuto. "Numerical approximation of parabolic problems by residual distribution schemes". English. In: *Int. J. Numer. Methods Fluids* 71.9 (2013), pp. 1191–1206.

[76] Pierre-Henri Maire, Rémi Abgrall, Jérôme Breil, Raphaël Loubère, and Bernard Rebourcet. "A nominally second-order cell-centered Lagrangian scheme for simulating elastic-plastic flows on two-dimensional unstructured grids". English. In: *J. Comput. Phys.* 235 (2013), pp. 626–665.

[77] Remi Abgrall. "A review of residual distribution schemes for hyperbolic and parabolic problems: the July 2010 state of the art". English. In: *Commun. Comput. Phys.* 11.4 (2012), pp. 1043–1080.

[78] R. Abgrall, G. Baurin, P. Jacq, and M. Ricchiuto. "Some examples of high order simulations parallel of inviscid flows on unstructured and hybrid meshes by residual distribution schemes". English. In: *Comput. Fluids* 61 (2012), pp. 6–13.

[79] R. Abgrall, A. Larat, and M. Ricchiuto. "Construction of very high order residual distribution schemes for steady inviscid flow problems on hybrid unstructured meshes". English. In: *J. Comput. Phys.* 230.11 (2011), pp. 4103–4136. URL: hal.inria.fr/inria-00464799/file/RR-7236.pdf.

[80] François Vilar, Pierre-Henri Maire, and Rémi Abgrall. "Cell-centered discontinuous Galerkin discretizations for two-dimensional scalar conservation laws on unstructured grids and for one-dimensional Lagrangian hydrodynamics". English. In: *Comput. Fluids* 46.1 (2011), pp. 498–504.

[81] R. Abgrall and J. Trefilik. "An example of high order residual distribution scheme using non-Lagrange elements". English. In: *J. Sci. Comput.* 45.1-3 (2010), pp. 3–25. URL: hal.inria.fr/inria-00403691/file/Gottlieb.pdf.

[82] M. Ricchiuto and R. Abgrall. "Explicit Runge-Kutta residual distribution schemes for time dependent problems: second order case". English. In: *J. Comput. Phys.* 229.16 (2010), pp. 5653–5691.

[83] Rémi Abgrall and Smadar Karni. "A comment on the computation of non-conservative products". English. In: *J. Comput. Phys.* 229.8 (2010), pp. 2759–2763.

[84] Remi Abgrall and Chi-Wang Shu. "Development of residual distribution schemes for the discontinuous Galerkin method: the scalar case with linear elements". English. In: *Commun. Comput. Phys.* 5.2-4 (2009), pp. 376–390.

[85] R. Abgrall, A. Larat, M. Ricchiuto, and C. Tavé. "A simple construction of very high order non-oscillatory compact schemes on unstructured meshes". English. In: *Comput. Fluids* 38.7 (2009), pp. 1314–1323. URL: hal.inria.fr/inria-00333756/file/CAF.pdf.

[86] R. Abgrall. "Construction of simple, stable, and convergent high order schemes for steady first order Hamilton-Jacobi equations". English. In: *SIAM J. Sci. Comput.* 31.4 (2009), pp. 2419–2446.

[87] Rémi Abgrall and Smadar Karni. "Two-layer shallow water system: a relaxation approach". English. In: *SIAM J. Sci. Comput.* 31.3 (2009), pp. 1603–1627.

[88] Richard Saurel, Fabien Petitpas, and Remi Abgrall. "Modelling phase transition in metastable liquids: application to cavitating and flashing flows". English. In: *J. Fluid Mech.* 607 (2008), pp. 313–350.

[89] M. Ricchiuto, N. Villedieu, R. Abgrall, and H. Deconinck. "On uniformly high-order accurate residual distribution schemes for advection-diffusion". English. In: *J. Comput. Appl. Math.* 215.2 (2008), pp. 547–556.

[90] N. Villedieu, T. Quintino, R. Abgrall, and H. Deconinck. "High-order residual distribution schemes on quadrilateral meshes". English. In: *Int. J. Numer. Methods Fluids* 56.8 (2008), pp. 1559–1566.

[91] Rémi Abgrall and Vincent Perrier. "On the numerical approximation of first-order Hamilton-Jacobi equations". English. In: *Int. J. Appl. Math. Comput. Sci.* 17.3 (2007), pp. 403–412.

[92] Pierre-Henri Maire, Rémi Abgrall, Jérôme Breil, and Jean Ovadia. "A cell-centered Lagrangian scheme for two-dimensional compressible flow problems". English. In: *SIAM J. Sci. Comput.* 29.4 (2007), pp. 1781–1824. URL: hal.inria.fr/inria-00113542/file/hydlagplan_gb.pdf.

[93] R. Abgrall and F. Marpeau. "Residual distribution schemes on quadrilateral meshes". English. In: *J. Sci. Comput.* 30.1 (2007), pp. 131–175.

[94] M. Ricchiuto, R. Abgrall, and H. Deconinck. "Application of conservative residual distribution schemes to the solution of the shallow water equations on unstructured meshes". English. In: *J. Comput. Phys.* 222.1 (2007), pp. 287–331.

[95] Rémi Abgrall. "Residual distribution schemes: current status and future trends". English. In: *Comput. Fluids* 35.7 (2006), pp. 641–669.

  

[96] Rémi Abgrall and Vincent Perrier. "Asymptotic expansion of a multiscale numerical scheme for compressible multiphase flow". English. In: *Multiscale Model. Simul.* 5.1 (2006), pp. 84–115.

[97] R. Abgrall. "Essentially non-oscillatory residual distribution schemes for hyperbolic problems". English. In: *J. Comput. Phys.* 214.2 (2006), pp. 773–808.

[98] Mikael Papin and Rémi Abgrall. "Entropic closure laws for two-fluids seven equation models". French. In: *C. R., Méc., Acad. Sci. Paris* 333.11 (2005), pp. 838–842.

[99] R. Abgrall, N. Andrianov, and M. Mezine. "Towards very high-order accurate schemes for unsteady convection problems on unstructured meshes". English. In: *Int. J. Numer. Methods Fluids* 47.8-9 (2005), pp. 679–691.

[100] Rémi Abgrall and Mohamed Mezine. "Construction of second-order accurate monotone and stable residual distribution schemes for steady problems". English. In: *J. Comput. Phys.* 195.2 (2004), pp. 474–507.

[101] R. Loubère, J. Ovadia, and R. Abgrall. "A Lagrangian discontinuous Galerkin-type method on unstructured meshes to solve hydrodynamics problems". English. In: *Int. J. Numer. Methods Fluids* 44.6 (2004), pp. 645–663.

[102] G. Billet and R. Abgrall. "An adaptive shock-capturing algorithm for solving unsteady reactive flows." English. In: *Comput. Fluids* 32.10 (2003), pp. 1473–1495.

[103] Rémi Abgrall. "Numerical discretization of boundary conditions for first order Hamilton–Jacobi equations". English. In: *SIAM J. Numer. Anal.* 41.6 (2003), pp. 2233–2261.

[104] R. Abgrall and P. L. Roe. "High-order fluctuation schemes on triangular meshes". English. In: *J. Sci. Comput.* 19.1-3 (2003), pp. 3–36.

[105] Rémi Abgrall and Mohamed Mezine. "Construction of second order accurate monotone and stable residual distribution schemes for unsteady flow problems." English. In: *J. Comput. Phys.* 188.1 (2003), pp. 16–55.

[106] Rémi Abgrall and Richard Saurel. "Discrete equations for physical and numerical compressible multiphase mixtures." English. In: *J. Comput. Phys.* 186.2 (2003), pp. 361–396.

[107] R. Abgrall, B. Nkonga, and R. Saurel. "Efficient numerical approximation of compressible multi-material flow for unstructured meshes." English. In: *Comput. Fluids* 32.4 (2003), pp. 571–605.

[108] Rémi Abgrall and Timothy Barth. "Residual distribution schemes for conservation laws via adaptive quadrature". English. In: *SIAM J. Sci. Comput.* 24.3 (2002), pp. 732–769.

[109] J. Massoni, R. Saurel, B. Nkonga, and R. Abgrall. "Some models and Eulerian methods for interface problems between compressible fluids with heat transfer". French. In: *Int. J. Heat Mass Transfer* 45.6 (2002), pp. 1287–1307.

[110] Rémi Abgrall, Thierry Colin, and Boniface Nkonga. "Study of a Schrödinger-Bloch system that describes the interaction of a laser with a gas". French. In: *C. R. Acad. Sci., Paris, Sér. I, Math.* 333.7 (2001), pp. 689–692.

[111] Rémi Abgrall and Smadar Karni. "Computations of compressible multifluids." English. In: *J. Comput. Phys.* 169.2 (2001), pp. 594–623.

[112] R. Abgrall. "Toward the ultimate conservative scheme: Following the quest". English. In: *J. Comput. Phys.* 167.2 (2001), pp. 277–315. URL: semanticscholar.org/paper/a13923eb016f49277a2257fd11b5c10ee42046be.

[113] Steeve Augoula and Rémi Abgrall. "High order numerical discretization for Hamilton-Jacobi equations on triangular meshes." English. In: *J. Sci. Comput.* 15.2 (2000), pp. 197–229.

[114] Richard Saurel and Rémi Abgrall. "A simple method for compressible multifluid flows". English. In: *SIAM J. Sci. Comput.* 21.3 (1999), pp. 1115–1145.

[115] Richard Saurel and Rémi Abgrall. "A multiphase Godunov method for compressible multifluid and multiphase flows". English. In: *J. Comput. Phys.* 150.2 (1999), pp. 425–467.

[116] R. Abgrall, S. Lantéri, and Thomas Sonar. "ENO approximations for compressible fluid dynamics". English. In: *ZAMM, Z. Angew. Math. Mech.* 79.1 (1999), pp. 3–28.

[117] Rémi Abgrall and Ami Harten. "Multiresolution representation in unstructured meshes". English. In: *SIAM J. Numer. Anal.* 35.6 (1998), pp. 2128–2146.

[118] Rémi Abgrall and Thomas Sonar. "On the use of Mühlbach expansions in the recovery step of ENO methods". English. In: *Numer. Math.* 76.1 (1997), pp. 1–25.

[119] R. Abgrall. "Numerical discretization of the first-order Hamilton-Jacobi equation on triangular meshes". English. In: *Commun. Pure Appl. Math.* 49.12 (1996), pp. 1339–1373.

  

[120] Rémi Abgrall. "How to prevent pressure oscillations in multicomponent flow calculations: A quasi conservative approach". English. In: *J. Comput. Phys.* 125.1 (1996), pp. 150–160. URL: hal.inria.fr/inria-00074304/file/RR-2372.pdf.

[121] R. Abgrall. "An essentially non-oscillatory reconstruction procedure on finite-element type meshes: Application to compressible flows". English. In: *Comput. Methods Appl. Mech. Eng.* 116.1-4 (1994), pp. 95–101.

[122] Rémi Abgrall. "Approximation of the genuinely multidimensional Riemann problem for the Euler equations by a Roe type method. I: The linearisation". French. In: *C. R. Acad. Sci., Paris, Sér. I* 319.5 (1994), pp. 499–504.

[123] Rémi Abgrall. "Approximation of the genuinely multidimensional Riemann problem for the Euler equations by a Roe type method. II: Solution of the approximated Riemann problem". French. In: *C. R. Acad. Sci., Paris, Sér. I* 319.6 (1994), pp. 625–629.

[124] R. Abgrall. "On essentially non-oscillatory schemes on unstructured meshes: Analysis and implementation". English. In: *J. Comput. Phys.* 114.1 (1994), pp. 45–58. URL: hdl.handle.net/2060/19930015303.

[125] R. Abgrall, L. Fezoui, and J. Talandier. "An extension of Osher's Riemann solver for chemical and vibrational non-equilibrium gas flows". English. In: *Int. J. Numer. Methods Fluids* 14.8 (1992), pp. 935–960. URL: hal.inria.fr/inria-00075337/file/RR-1221.pdf.

[126] Rémi Abgrall. "On the asymptotic behaviour of the coefficients of some polynomial approximations". French. In: *C. R. Acad. Sci., Paris, Sér. I* 315.1 (1992), pp. 97–100.

[127] Rémi Abgrall. "An extension of Roe's upwind scheme to algebraic equilibrium real gas models". English. In: *Comput. Fluids* 19.2 (1991), pp. 171–182.

[128] Rémi Abgrall. "Hypersonic calculations by Riemann solvers techniques". English. In: *Comput. Phys. Commun.* 65.1-3 (1991), pp. 1–7.

[129] Rémi Abgrall and Jean-Louis Montagné. "Généralisation du schéma d'Osher pour le calcul d'écoulements de mélanges de gaz a concentrations variables et de gaz réels. (Generalization of the Osher scheme for calculating flows of mixed gases of variable concentrations, and of real gases)". French. In: *Rech. Aérosp.* 1989.4 (1989), pp. 1–13.

[130] Rémi Abgrall. "Généralisation du schéma de Roe pour le calcul d'écoulements de mélanges de gaz a concentrations variables. (Generalization of the Roe scheme for computing flows of mixed gases at variable concentrations)". French. In: *Rech. Aérosp.* 1988.6 (1988), pp. 31–43.

[131] Rémi Abgrall and Claude Basdevant. "Un schéma numérique semi-Lagrangien pour la turbulence bidimensionnelle. (A semi-Lagrangian numerical scheme for two-dimensional turbulence)". French. In: *C. R. Acad. Sci., Paris, Sér. I* 305 (1987), pp. 315–318.

## Preprints

[132] Rémi Abgrall, Alina Chertock, Alexander Kurganov, and Lorenzo Micalizzi. *A New Semi-Discrete Finite-Volume Active Flux Method for Hyperbolic Conservation Laws*. Preprint, arXiv:2505.00798 [math.NA] (2025). 2025. URL: https://arxiv.org/abs/2505.00798.

[133] R. Abgrall, M. Dumbser, and P. H. Maire. *A simple and general framework for the construction of exactly div-curl-grad compatible discontinuous Galerkin finite element schemes on unstructured simplex meshes*. Preprint, arXiv:2503.24131 [math.NA] (2025). 2025. URL: https://arxiv.org/abs/2503.24131.

[134] Rémi Abgrall, Yongle Liu, and Walter Boscheri. *Bound preserving Point-Average-Moment PolynomiAl-interpreted (PAMPA) on polygonal meshes*. Preprint, arXiv:2502.10069 [math.NA] (2025). 2025. URL: https://arxiv.org/abs/2502.10069.

[135] Rémi Abgrall, Miaosen Jiao, Yongle Liu, and Kailiang Wu. *A Novel and Simple Invariant-Domain-Preserving Framework for PAMPA Scheme: 1D Case*. Preprint, arXiv:2412.03423 [math.NA] (2024). 2024. URL: https://arxiv.org/abs/2412.03423.

[136] Giuseppe Sirianni, Alberto Guardone, Barbara Re, and Rémi Abgrall. *An Explicit Primitive Conservative Solver for the Euler Equations with Arbitrary Equation of State*. Preprint, arXiv:2404.07710 [math.NA] (2024). 2024. URL: https://arxiv.org/abs/2404.07710.

  

## Chapters

[137] R. Abgrall and S. Mishra. "Uncertainty qualification for hyperbolic systems of conservation laws". English. In: *Handbook on numerical methods for hyperbolic problems. Applied and modern issues*. Amsterdam: Elsevier/North Holland, 2017, pp. 507–544.

[138] R. Abgrall. "Some failures of Riemann solvers". English. In: *Handbook on numerical methods for hyperbolic problems. Applied and modern issues*. Amsterdam: Elsevier/North Holland, 2017, pp. 351–360.

[139] Rémi Abgrall. "A biased short review of residual distribution schemes for hyperbolic problems". English. In: *Adaptive high-order methods in computational fluid dynamics*. Hackensack, NJ: World Scientific, 2011, pp. 269–298.

[140] R. Abgrall. "First order schemes for the Euler equations". English. In: *Lecture notes on numerical methods for hyperbolic equations. Short course book. Papers based on the presentations at the short course, Santiago de Compostela, Spain, July 2–4, 2011*. Boca Raton, FL: CRC Press, 2011, pp. 27–51.

[141] Rémi Abgrall, Thomas Sonar, Oliver Friedrich, and Germain Billet. "High order approximations for compressible fluid dynamics on unstructured and Cartesian meshes". English. In: *High-order methods for computational physics*. Berlin: Springer, 1999, pp. 1–67.