

## Francesco P. Andriulli

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### Education

- **Doctor of Philosophy**, University of Michigan, Ann Arbor, Michigan 2005-2008
- **M.Sc. in Electrical Engineering and Computer Science**, University of Illinois, Chicago, Illinois. 2002-2004
- **Laurea in Electrical Engineering**, Politecnico di Torino, Turin, Italy 1999-2004

### Key facts

- **Recipient of an ERC grant of the European Union “321: From Cubic<sup>3</sup> To<sup>2</sup> Linear<sup>1</sup> Complexity in Computational Electromagnetics”**. (ERC Consolidator Grant 2016, **two million euros**).
- More than **60 papers** published or in print on international ISI journals and **90 papers** in peer-reviewed conference proceedings, **23 invited contributions**.
- **More than 20 Awards and distinctions** for scientific publications.
- **Fellow of the IEEE** for “*Contributions to Computational Electromagnetics*”
- Recipient of the **2015 EurAAP Leopold B. Felsen Award for Excellence in Electrodynamics**
- Recipient of the **URSI Issac Koga Gold Medal** (triennium 2014-2016).
- Recipient of the **IEEE AP-S Donald G. Dudley Undergraduate Teaching Award**.
- **Editor-in-Chief** of IEEE APM, **Track Editor** of IEEE TAP, **Associate Editor** of **other 4 journals** (2 from the IEEE: IEEE AWPL and IEEE Access)
- **Advisor of 8 PhD students and 2 Post-Docs**. Past advisor of 12 graduated PhD students (6 currently faculty members).
- **Current and past Principal investigator** for **11** national and international research projects (More than **4.3 million euros** of personal budget in the last four years).

## Research Positions

<b>Full Professor</b> Department of Electronics and Telecommunications Politecnico di Torino Turin, Italy	2017-present
<b>Full Professor</b> IMT Atlantique Institut Mines-Telecom Brest, France	2014-2017
<b>Associate Professor</b> IMT Atlantique Institut Mines-Telecom Brest, France	2010-2014
<b>Research Associate and Adjunct Professor</b> Department of Electrical Engineering Politecnico di Torino Turin, Italy	2008-2010
<b>Research Assistant</b> The Radiation Laboratory Department of Electrical Engineering and Computer Science University of Michigan at Ann Arbor Ann Arbor, Michigan	2005-2008

## Honors and Awards

- IEEE Fellow, Class of 2023, for “Contributions to Computational Electromagnetics” 2023
  - EurAAP Leopold B. Felsen Award for Excellence in Electrodynamics. 2015
  - ICEAA IEEE-APWC Best Paper Award 2015
  - URSI Issac Koga Gold Medal (triennium 2014-2016) 2014
- “For contributions to computational electromagnetics, specifically the development of preconditioned and stable integral equation solvers”.*
- IEEE AP-S Donald G. Dudley Jr. Undergraduate Teaching Award 2014
- "For the excellence in advising undergraduate research and in the development of research inspired courses in applied and computational electromagnetics".*
- Young Scientist Award and second prize in the Best Young Scientist Paper Contest URSI International Symposium on Electromagnetic Theory, Hiroshima. 2013
  - URSI Young Scientist Award, International Symposium on Electromagnetic Theory (EMTS 2010), Berlin. 2010

- IEEE Antennas and Propagation Society Raj Mitra Travel Grant. 2009
- Best Student Paper Award at the IEEE Antennas and Propagation Society International Symposium, San Diego (authored 2 out of 15 finalist papers). 2008
- Best Student Paper Award at the URSI North American Radio Science Meeting, Ottawa. 2007
- Membership in the honor societies of Eta Kappa Nu, Tau Beta Pi, and Phi Kappa Phi
- In addition FPA co-authored with his students and collaborators other three first prize conference papers (EMTS 2016, URSI-DE Meeting 2014, ICEAA 2009), a second prize conference paper (URSI GASS 2014), a third prize conference paper (URSI/IEEE-APS 2018, eight honorable mention conference papers (ICEAA 2011, URSI/IEEE-APS 2013, URSI/IEEE-APS 2020, (URSI/IEEE-APS 2022) and other four finalist conference papers (URSI/IEEE-APS 2012, URSI/IEEE-APS 2007, URSI/IEEE-APS 2006, (URSI/IEEE-APS 2022).

## International Short Courses

**Advanced Computational EM for Antenna Analysis.** Organizer and co-coordinator of this week-long international course which is part of the European School of Antennas. (held in Paris 2014, Paris 2016, Turin 2018).

**Fast Solvers for Electromagnetic Integral Equations.** Taught as a part of a course of the European School of Antennas at EPFL (October 2010) and at the Politecnico di Torino (October 2012).

**Advanced preconditioning techniques for computational electromagnetics.** Taught during the URSI/IEEE Antennas and Propagation Society International Symposium in Spokane (2011), Chicago (2012), Orlando (2013), Memphis (2014), Vancouver (2015), and Puerto Rico (2016).

## Professional Services and Affiliations

Administrative Committee Member, IEEE Antennas and Propagation Society

Editor-in-Chief, IEEE Antennas and Propagation Magazine

Track Editor, IEEE Transactions on Antennas and Propagation

Associate Editor, URSI Radio Science Letters

Past Associate Editor, IEEE Antennas and Wireless Propagation Letters

Past Associate Editor, IEEE Access

Past Associate Editor, IET Microwaves, Antennas & Propagation

Reviewer for the IEEE Transactions on Antennas and Propagation

Reviewer for the IEEE Transactions on Microwave Theory and Techniques

Reviewer for the IEEE Transactions on Electromagnetic Compatibility

Reviewer for the IEEE Antennas and Wireless Propagation Letters

Reviewer for the IEEE Microwave and Wireless Components Letters

Reviewer for IEEE Access

Reviewer for the Journal of Computational Physics

Reviewer for the Journal of Electromagnetic Waves and Applications

Reviewer for Radio Science  
Reviewer for IET Microwave, Antennas and Propagation  
Reviewer for the International Journal of Electronics (Taylor and Francis)  
Reviewer for the International Journal of Electronics and Communications  
Reviewer for the Journal of Circuits, Systems, and Computers  
Reviewer for the International Journal of Numerical Modelling  
Reviewer for Engineering Analysis with Boundary Elements  
Reviewer for the SIAM Journal of Numerical Analysis  
Reviewer for Applied Mathematics and Computation  
Reviewer for Applied Mathematical Modelling  
Reviewer for the Journal of Mathematical Analysis and Applications  
Reviewer for the Journal of Computational and Applied Mathematics  
Reviewer for Journal of Neural Engineering

Senior member of the IEEE  
Member of the European Association on Antennas and Propagation (EurAAP)  
Member of the IEEE Antennas and Propagation Society  
Member of the IEEE Microwave Theory and Techniques Society  
Member of the IEEE Engineering in Medicine and Biology Society  
Member of the IEEE Education Society

Member of the International Board of the European School of Antennas

### **TPC memberships, organization of convened sessions, and (selected) invited contributions at international conferences and symposia**

**Invited speaker**, International Conference on Microwaves, Communications, Antennas, Biomedical Engineering & Electronic Systems, COMCAS 2023.

**IAS Distinguished Scholar** of the Mortimer and Raymond Sackler Institute of Advanced Studies, 2021/2022

**Keynote Speaker** 2019 IEEE International Conference on Antennas Measurements and Applications (IEEE CAMA 2019). Bali, Indonesia, October 2019.

**Technical Program Committee Member** IEEE International Symposium on Antennas and Propagation 2019. Atlanta, USA, July 2019.

**Technical Program Committee Member** IEEE International Symposium on Antennas and Propagation 2018. Boston, USA, July 2018.

**Invited speaker**, Workshop on Numerical methods for wave propagation and applications, Université Pierre et Marie Curie, Paris, 2017.

**Invited speaker**, International Workshop on Electromagnetic Theory, Modeling, and Simulations. Chengdu, 2017.

**Technical Program Committee Member** IEEE International Symposium on Antennas and Propagation 2017. San Diego, USA, July 2017.

**Scientific Committee Member** International Conference on Electromagnetics in Advanced Applications ICEAA-IEEE APWC 2017. Verona, Italy.

**Technical Program Committee Member** Journées Scientifiques d'URSI-France, February 2017.

**Technical Program Committee Member** IEEE International Symposium on Antennas and Propagation 2016. Puerto Rico, USA, June 2016.

**Invited speaker**, Workshop on New Trends in Integral Equations. Ecole Polytechnique, Paris, 2016.

**Invited speaker**, International Workshop on Electromagnetic Theory, Modeling, and Simulations. Chengdu, 2015.

**Technical Program Committee Member** IEEE International Symposium on Antennas and Propagation 2015. Vancouver, Canada, July 2015.

**Technical Program Committee Member** 2015 IEEE International Conference on Computational Electromagnetics.

**Technical Program Committee Member** Conférence Européenne sur les Méthodes Numériques en Electromagnétisme (NUMELEC 2015).

**Technical Program Committee Member** Journées Scientifiques d'URSI-France, July 2014.

**Technical Program Committee Member** IEEE International Symposium on Antennas and Propagation 2014. Memphis, Tennessee, July 2014.

**Technical Program Committee Member** IEEE International Symposium on Antennas and Propagation 2013, Florida, July 2013.

**Technical Program Committee Member** IEEE International Symposium on Antennas and Propagation 2012. Chicago, Illinois, July 2012.

**Convened Session Organizer**, URSI General Assembly. Beijing, August 2014, Session: Electromagnetic Uncertainty Quantification.

**Convened Session Organizer**, Applied Computational Electromagnetics Society International Symposium ACES 2013, Session: Fast Integral Equation Methods and Stable Discretizations.

**Convened Session Organizer**, Applied Computational Electromagnetics Society International Symposium ACES 2012, Session: Advanced Integral Equation Methods.

**Convened Session Organizer**, European Conference on Antennas and Propagation (EUCAP) 2011, Session: Numerical Methods for Multi-Scale Problems.

**Invited talk**, Mathematisches Forschungsinstitut Oberwolfach 2013 meeting on Computational Electromagnetism and Acoustics.

**Invited paper**, F. P. Andriulli, K. Cools, I. Bogaert. Stable Solutions of EM Integral Equation in the Entire Frequency Spectrum Without the Search for Global Loops. International Conference on Advanced Computational Methods in Engineering.

**Invited paper**, F. P. Andriulli. Analysis and Efficient Algorithms for a Set of

Generalized RWG Basis Functions, EUCAP 2014, De Haag.

**Invited paper**, F. P. Andriulli (On the Use of Graph Laplacians in the Integral Equation Modeling of Complex and Multiscale Problems). IEEE APS 2014, Memphis.

**Invited paper**, F. P. Andriulli, K. Cools, I. Bogaert, and E. Michielssen. A Magnetic Type Integral Operator which is Stable till Extremely Low Frequencie, URSI GASS 2014, Beijing.

**Invited talk**, F. P. Andriulli. Preconditioned and stable integral formulations. Workshop on Computational Electromagnetics, URSI GASS 2014, Beijing.

**Invited paper**, F. P. Andriulli. Hierarchical EM Preconditioners with Spectral Domain Partitioning. Proceedings of the 6th European Conference on Antennas and Propagation (EuCAP), 2012.

**Invited paper**, F. P. Andriulli, “Spectral Properties and Regularization of Loop, Star, and Tree Related Gram Matrices” . *International Review of Progress in Applied Computational Electromagnetics (ACES 2010)*, Tampere Finland, April 2010.

**Invited paper**, F. P. Andriulli, G. Vecchi, “Helmholtz-stable fast solution of the Combined Field Integral Equation.” . *European Conference on Antennas and Propagation (EuCAP)*, Barcelona, Spain, April 2010.

**Invited paper**, F. P. Andriulli, “Analysis and Stable Inversions of Standard Quasi-Helmholtz Decompositions”. International Symposium on Electromagnetic Theory (EMTS2010), Berlin, Germany, August 2010.

**Invited paper**, F. P. Andriulli, G. Vecchi, “On the Regularization of the Vector Potential in the Electric Field Integral Equation.” . *European Conference on Antennas and Propagation (EuCAP)*, Rome, Italy, April 2011.

**Invited talk**, F. P. Andriulli “Perspectives and Open Problems in Preconditioning EM Integral Equations.”. invited in the session “Ten Open Problems in Computational Electromagnetics” *IEEE Antennas and Propagat. Int. Symp.*, Spokane, USA, July 2011.

## Publications

The publication record includes **61 papers published** on international peer-reviewed ISI journals, 3 journal papers under review, and **90 papers in conference proceedings** (of which **25 invited contributions**).

Google Scholar: total citations >**2500**, h-index: **23**, g-index: **46**

<http://scholar.google.com/citations?user=w-SFwyMAAAAJ&hl=it>

## Journal papers

- [R1]. Dély, Alexandre; Merlini, Adrien; Cools, Kristof; Andriulli, Francesco P. Convolution Quadrature Time Domain Integral Equation Methods for Electromagnetic Scattering Advances in Time-Domain Computational Electromagnetic Methods, 2022
- [R2]. Chen, Rui; Arda Ulku, H.; Andriulli, Francesco P.; Bagci, Hakan On the Low-Frequency Behavior of Vector Potential Integral Equations for Perfect Electrically Conducting Scatterers IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, 2022
- [R3]. Wang, Sr; Li, Mm; Yang, T; Ai, X; Liu, Jq; Andriulli, Fp; Ding, Dz Cone-Shaped Space Target Inertia Characteristics Identification by Deep Learning With Compressed Dataset IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, 2022
- [R4]. Adrian, Simon B.; Alexandre, Dély; Consoli, Davide; Merlini, Adrien; Andriulli, Francesco P. Electromagnetic Integral Equations: Insights in Conditioning and Preconditioning IEEE OPEN JOURNAL OF ANTENNAS AND PROPAGATION, 2021
- [R5]. Chhim, Tiffany L.; Merlini, Adrien; Rahmouni, Lyes; Guzman, John Erick Ortiz; Andriulli, Francesco P. Eddy Current Modeling in Multiply Connected Regions Via a Full-Wave Solver Based on the Quasi-Helmholtz Projectors IEEE OPEN JOURNAL OF ANTENNAS AND PROPAGATION, 2020
- [R6]. Monin, Maxime; Rahmouni, Lyes; Merlini, Adrien; Andriulli, Francesco P. A Hybrid Volume-Surface-Wire Integral Equation for the Anisotropic Forward Problem in Electroencephalography IEEE JOURNAL OF ELECTROMAGNETICS, RF AND MICROWAVES IN MEDICINE AND BIOLOGY., 2020
- [R7]. Merlini, A.; Dely, A.; Cools, K.; Andriulli, F. P. Electromagnetic modelling at arbitrarily low frequency via the quasi-Helmholtz projectors Advances in Mathematical Methods for Electromagnetics, 2020
- [R8]. Merlini, A.; Beghein, Y.; Cools, K.; Michielssen, E.; Andriulli, F. P. Magnetic and Combined Field Integral Equations Based on the Quasi-Helmholtz Projectors IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, 2020
- [R9]. Rahmouni, Lyes; Merlini, Adrien; Pillain, Axelle; Andriulli, Francesco P. On the modelling of brain fibers in the EEG Forward Problem via a New Family of Wire Integral Equations JOURNAL OF COMPUTATIONAL PHYSICS: X, 2020
- [R10]. Cheng, X.; Henry, C.; Andriulli, F. P.; Person, C.; Wiart, J. A surrogate model based on

artificial neural network for RF radiation modelling with high-dimensional data  
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH, 2020

- [R11]. Pillain, Axelle; Rahmouni, Lyes; Andriulli, Francesco Handling anisotropic conductivities in the EEG forward problem with a symmetric formulation PHYSICS IN MEDICINE & BIOLOGY, 2019
- [R12]. Dely, Alexandre; Andriulli, Francesco P.; Cools, Kristof Large Time Step and DC Stable TD-EFIE Discretized with Implicit Runge-Kutta Methods IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, 2019
- [R13]. Adrian, S. B.; Andriulli, F. P.; Eibert, T. F. On a refinement-free Calderón multiplicative preconditioner for the electric field integral equation JOURNAL OF COMPUTATIONAL PHYSICS, 2019
- [R14]. Pillain, Axelle, Lyes Rahmouni, and Francesco P. Andriulli. "Handling anisotropic conductivities in the EEG forward problem with a symmetric formulation." Physics in medicine and biology (2018).
- [R15]. Pillain, Axelle, Lyes Rahmouni, and Francesco P. Andriulli. "A Calderon regularized symmetric formulation for the electroencephalography forward problem." Journal of Computational Physics 375 (2018): 291-306.
- [R16]. Lindgren, J. T., Merlini, A., Lécuyer, A., & Andriulli, F. P. (2018). simBCI—A Framework for Studying BCI Methods by Simulated EEG. IEEE Transactions on Neural Systems and Rehabilitation Engineering, 26(11), 2096-2105.
- [R17]. Rahmouni, L., Adrian, S. B., Cools, K., & Andriulli, F. P. (2018). Conforming discretizations of boundary element solutions to the electroencephalography forward problem. Comptes Rendus Physique, 19(1-2), 7-25.
- [R18]. Gaffoglio, R., Cagliero, A., Vecchi, G., & Andriulli, F. P. (2018). Vortex waves and channel capacity: Hopes and reality. IEEE Access, 6, 19814-19822.
- [R19]. Y. Beghein, R. Mitharwal, K. Cools, and F. P. Andriulli On a low-frequency and refinement stable PMCHWT integral equation leveraging the quasi-Helmholtz projectors IEEE Transactions on Antennas and Propagation , Vol. 65, n.10, 2017, pp. 5365-5375.
- [R20]. L. Rahmouni, R. Mitharwal, and F. P. Andriulli Two Volume Integral Equations for the Inhomogeneous and Anisotropic Forward Problem in Electroencephalography Journal of Computational Physics , Vol. 348, 2017, pp. 732-743.
- [R21]. A. Dely, F. P. Andriulli, and K. Cools An Impedance Boundary Condition EFIE that is Low-Frequency and Refinement Stable IEEE Transactions on Antennas and Propagation , Vol. 65, n.3, 2017, pp. 1259-1266.
- [R22]. H. A. Ulku; I. Bogaert; K. Cools; F. P. Andriulli and H. Bagci Mixed Discretization of the Time Domain MFIE at Low Frequencies. IEEE Antennas and Wireless Propagation Letters , Vol. 16, 2017, pp. 1565-1568.
- [R23]. E. Libessart, M. Arzel, C. Lahuec and F. P. Andriulli A Scaling-Less Newton-Raphson Pipelined Implementation for a Fixed-Point Reciprocal Operator. IEEE Signal Processing Letters , Vol. 24, n.6, 2017, pp. 789-793.



- [R24]. S. B. Adrian, F. P. Andriulli, and T. F. Eibert A Hierarchical Preconditioner for the Electric Field Integral Equation on Unstructured Meshes Based on Primal and Dual Haar Bases. *Journal of Computational Physics* , Vol. 330, n.1, 2017, pp. 365-379. (Published online in 2016).
- [R25]. A. A. Ijjeh, M. M. Ney, and F. P. Andriulli Stability and Dispersion Analysis of a TLM Unified Approach for Dispersive Anisotropic Media. *IEEE Transactions on Microwave Theory and Techniques* , Vol. 65, n.4, 2017, pp. 1141-1149. (Published online in 2016).
- [R26]. J. E. O. Guzman, S. B. Adrian, R. Mitharwal, Y. Beghein, T. Eibert, K. Cools, and F. P. Andriulli On the Hierarchical Preconditioning of the PMCHWT Integral Equation on Simply and Multiply Connected Geometries. *IEEE Antennas and Wireless Propagation Letters* , Vol. 16, 2017, pp. 1044-1047. (Published online in 2016).
- [R27]. S. B. Adrian, F. P. Andriulli, and T. F. Eibert On the Hierarchical Preconditioning of the Combined Field Integral Equation. *IEEE Antennas and Wireless Propagation Letters* , Vol. 15, 2016, pp. 1897-1900.
- [R28]. R. Mitharwal and F. P. Andriulli A Regularized Boundary Element Formulation for Contactless SAR Evaluations within Homogeneous and Inhomogeneous Head Phantoms (**invited**) *Comptes Rendus Physique*, Vol. 16, n. 9, 2015, pp. 776-788.
- [R29]. Y. Beghein, K. Cools, and F. P. Andriulli A DC-stable, Well Balanced, Calderon Preconditioned Time Domain Electric Field Integral Equation *IEEE Transactions on Antennas and Propagation* , Vol. 63, n.12, 2015, pp. 5650-5660.
- [R30]. Y. Beghein, K. Cools, and F. P. Andriulli A DC Stable and Large-Time Step Well-Balanced TD-EFIE Based on Quasi-Helmholtz Projectors. *IEEE Transactions on Antennas and Propagation* , Vol. 63, n.7, 2015, pp. 3087-3097.
- [R31]. R. Mitharwal and F. P. Andriulli. On the Multiplicative Regularization of Graph Laplacians on Closed and Open Structures with Applications to Spectral Partitioning *IEEE Access* , Vol. 62, 2014, pp. 788-796.
- [R32]. S. B. Adrian, F. P. Andriulli, and T. F. Eibert Hierarchical Bases Preconditioners for the Electric Field Integral Equation on Multiply Connected Geometries. *IEEE Transactions on Antennas and Propagation*, Accepted for publication.
- [R33]. I. Bogaert and F. P. Andriulli. Maximally Orthogonal High-Order Basis Functions have a Well-Conditioned Gram Matrix. *IEEE Transactions on Antennas and Propagation* , Vol. 62, n.8, 2014, pp. 4096-4104.
- [R34]. I. Bogaert, K. Cools, F. P. Andriulli, and H. Bagci Low-Frequency Scaling of the Standard and Mixed Magnetic Field and Muller Integral Equations. *IEEE Transactions on Antennas and Propagation* , Vol. 62, n.2, 2014, pp. 822-831.
- [R35]. F. P. Andriulli, K. Cools, I. Bogaert, and E. Michielssen. On a Well-Conditioned Electric Field Integral Operator for Multiply Connected Geometries. *IEEE Transactions on Antennas and Propagation* , Vol. 61, n.4, 2013, pp. 2077-2087.
- [R36]. F. Valdes, M. Ghaffari-Miab, F. P. Andriulli, K. Cools, and E. Michielssen. High-Order Calderón Preconditioned Time Domain Integral Equation Solvers. *IEEE Transactions on Antennas and Propagation* , Vol. 61, n.5, 2013, pp. 2570-2588.

- [R37]. F. Valdes, F. P. Andriulli, H. Bagci, and E. Michielssen. Time Domain Single Source Integral Equations for Analyzing Scattering from Homogeneous Penetrable Objects. *IEEE Transactions on Antennas and Propagation* , Vol. 61, n.3, 2013, pp. 1239-1254.
- [R38]. F. P. Andriulli. Loop-Star and Loop-Tree Decompositions: Analysis and Efficient Algorithms . *IEEE Transactions on Antennas and Propagation* , Vol. 60, n.5, 2012, pp. 2347-2356.
- [R39]. F. P. Andriulli, and G. Vecchi. A Helmholtz-Stable Fast Solution of the Electric Field Integral Equation . *IEEE Transactions on Antennas and Propagation* , Vol. 60, n.5, 2012, pp. 2357-2366.
- [R40]. P. Yla-Oijala, S. P. Kiminki, K. Cools, F. P. Andriulli, and S. Jarvenpaa. Mixed Discretization Schemes for Electromagnetic Surface Integral Equations . *International Journal of Numerical Modelling: Electronic Networks, Devices and Fields* , Vol. 25, n.5, 2012, pp. 525-540.
- [R41]. P. Yla-Oijala, S. P. Kiminki, K. Cools, F. P. Andriulli, and S. Jarvenpaa. Stable Discretization of Combined Source Integral Equation for Scattering by Dielectric Objects . *IEEE Transactions on Antennas and Propagation* , Vol. 60, n.5, 2012, pp. 2575-2578.
- [R42]. Y. Beghein, K. Cools, F. P. Andriulli, D. De Zutter, and E. Michielssen. A Calderon Multiplicative Preconditioner for the PMCHWT Equation for Scattering by Chiral Objects. *IEEE transactions on antennas and propagation*, Vol. 60, n.9, 2012, pp. 4239-4248.
- [R43]. K. Cools, F. P. Andriulli, and E. Michielssen. A Calderon Multiplicative Preconditioner for the PMCHWT Integral Equation . *IEEE Transactions on Antennas and Propagation* , Vol. 59, n.12, 2011, pp. 4579-4587.
- [R44]. F. Valdes, F. P. Andriulli, H. Bagci, and E. Michielssen. A Calderon-Preconditioned Single Source Combined Field Integral Equation for Analyzing Scattering from Homogeneous Penetrable Objects . *IEEE Transactions on Antennas and Propagation* , Vol. 59, n.6, 2011, pp. 2315-2328.
- [R45]. F. Valdes, F. P. Andriulli, K. Cools, and E. Michielssen. High-Order Div- and Quasi Curl-Conforming Basis Functions for Calderon Multiplicative Preconditioning of the EFIE . *IEEE Transactions on Antennas and Propagation* , Vol. 59, n.4, 2011, pp. 1321-1337.
- [R46]. K. Cools, F. P. Andriulli, D. De Zutter, and E. Michielssen. Accurate and Conforming Mixed Discretization of the MFIE . *IEEE Antennas and Wireless Propagation Letters* , Vol. 10, 2011, pp. 528-531.
- [R47]. R. Graglia, A. Peterson, and F. P. Andriulli. Curl-conforming hierarchical vector bases for triangles and tetrahedra . *IEEE Transactions on Antennas and Propagation* , Vol. 59, n.3, 2011, pp. 950-959.
- [R48]. H. Bagci, F. P. Andriulli, K. Cools, F. Olyslager, and E. Michielssen. A Calderon Multiplicative Preconditioner for Coupled Surface-Volume Electric Field Integral Equations . *IEEE Transactions on Antennas and Propagation* , Vol. 58, n.8, 2010, pp. 2680-2690.
- [R49]. F. P. Andriulli, A. Tabacco, and G. Vecchi. Solving the EFIE at Low-Frequencies with a

- Conditioning that Grows only Logarithmically with the Number of Unknowns. *IEEE Transactions on Antennas and Propagation* , Vol. 58, n.5, 2010, pp. 1614-1624.
- [R50]. H. Bagci, F. P. Andriulli, F. Vipiana, G. Vecchi, and E. Michielssen. A Well-Conditioned Integral-Equation Formulation For Transient Analysis of Low-Frequency Microelectronic Devices. *IEEE Transactions on Advanced Packaging* , Vol. 33, n.2, 2010, pp. 468-480.
- [R51]. F. P. Andriulli, H. Bagci, F. Vipiana, G. Vecchi, and E. Michielssen. Analysis and Regularization of the TD-EFIE Low Frequency Breakdown. *IEEE Transactions on Antennas and Propagation* , Vol. 57, n.7, 2009, pp. 2034-2046.
- [R52]. F. Vipiana, F. P. Andriulli, and G. Vecchi. Two-tier Non-simplex Grid Hierarchic Basis for General 3D Meshes. *Waves in Random and Complex Media*, Vol. 19, n.1, 2009, pp. 126-146.
- [R53]. H. Bagci, F. P. Andriulli, K. Cools, F. Olyslager, and E. Michielssen. A Calderon Multiplicative Preconditioner for the Combined Field Integral Equation. *IEEE Transactions on Antennas and Propagation* , Vol. 57, n.10, 2009, pp. 3387-3392.
- [R54]. K. Cools, F. P. Andriulli, F. Olyslager, and E. Michielssen. Nullspaces of MFIE and Calderon Preconditioned EFIE Operators Applied to Toroidal Surfaces. *IEEE Transactions on Antennas and Propagation* , Vol. 57, n.10, 2009, pp. 3205-3215.
- [R55]. F. P. Andriulli, K. Cools, F. Olyslager, and E. Michielssen. Time-Domain Calderon Identities and their Application to the Integral Equation Analysis of Scattering by PEC Objects, Part II: Stability. *IEEE Transactions on Antennas and Propagation* , Vol. 57, n.8, 2009, pp. 2365-2375.
- [R56]. K. Cools, F. P. Andriulli, F. Olyslager, and E. Michielssen. Time-Domain Calderon Identities and their Application to the Integral Equation Analysis of Scattering by PEC Objects, Part I: Preconditioning. *IEEE Transactions on Antennas and Propagation* , Vol. 57, n.8, 2009, pp. 2352-2364.
- [R57]. F. P. Andriulli, K. Cools, H. Bagci, F. Olyslager, A. Buffa, S. Christiansen, and E. Michielssen. A Multiplicative Calderon Preconditioner for the Electric Field Integral Equation. *IEEE Transactions on Antennas and Propagation* , Vol. 56, n.8, 2008, pp. 2398-2412.
- [R58]. F. P. Andriulli, F. Vipiana, and G. Vecchi. Hierarchical Bases for Non Hierarchic 3D Triangular Meshes. *IEEE Transactions on Antennas and Propagation* , Vol. 56, n.8, 2008, pp. 2288-2297.
- [R59]. F. P. Andriulli, A. Tabacco, and G. Vecchi. A Multiresolution Approach to the Electric Field Integral Equation in Antenna Problems. *SIAM Journal on Scientific Computing* , Vol. 29, n.1, 2007, pp. 1-21.
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