

Project publications

Theses

Y. Ivanenko. “Estimation of electromagnetic material properties with application to high-voltage power cables”. Växjö, Sweden: Department of Physics and Electrical Engineering, Linnæus University, 2017.

M. Nedic. “Integral representations of Herglotz-Nevanlinna functions”. Stockholm, Sweden: Department of Mathematics, Stockholm University, 2017.

Book chapters

M. Gustafsson, D. Tayli, and M. Cismasu. “Physical bounds of antennas”. In: *Handbook of Antenna Technologies*. Edited by Z. N. Chen. Springer-Verlag, 2016.

Journal papers

2017

M. Capek, V. Losenicky, L. Jelinek, and M. Gustafsson. “Validating the Characteristic Modes Solvers”. *IEEE Trans. Antennas Propagat.* (2017).

A. Luger and M. Nedic. “A characterization of Herglotz-Nevanlinna functions in two variables via integral representations”. *Arkiv för Matematik (to appear in)* (2017).

S. Nordebo, M. Dalarsson, Y. Ivanenko, D. Sjöberg, and R. Bayford. “On the physical limitations for radio frequency absorption in gold nanoparticle suspensions”. *J. Phys. D: Appl. Phys* (2017).

2016

M. Gustafsson, D. Tayli, C. Ehrenborg, M. Cismasu, and S. Nordebo. “Antenna current optimization using MATLAB and CVX”. *FERMAT*, 15 (5) (2016).

S. Nordebo, M. Gustafsson, Y. Ivanenko, B. Nilsson, and D. Sjöberg. “Cylindrical multipole expansion for periodic sources with applications for three-phase power cables”. *Mathematical Methods in the Applied Sciences* (2016).

D. Tayli and M. Gustafsson. “Physical Bounds for Antennas Above a Ground Plane”. *Antennas and Wireless Propagation Letters, IEEE*, 15 (2016): 1281–1284.

G. Wolgast, C. Ehrenborg, A. Israelsson, J. Helander, E. Johansson, and H. Maneffjord. “Wireless Body Area Network for Heart Attack Detection”. *IEEE Antennas and Propagation Magazine*, 58 (5) (2016): 84–92.

2015

- H. Frid, H. Holter, and B. L. G. Jonsson. “An approximate method for calculating the near-field mutual coupling between line-of-sight antennas on vehicles”. *IEEE Transactions on Antennas and Propagation*, 63 (9) (2015): 4132–4138.
- M. Gustafsson and B. L. G. Jonsson. “Antenna Q and stored energy expressed in the fields, currents, and input impedance”. *IEEE Trans. Antennas Propagat.* 63 (1) (2015): 240–249.
- M. Gustafsson and B. L. G. Jonsson. “Stored electromagnetic energy and antenna Q”. *Progress in Electromagnetic Research*, 150 (2015): 13–27.
- S. Gustafsson, B. Nilsson, S. Nordebo, and M. Sjöberg. “Wave propagation characteristics and model uncertainties for HVDC power cables”. *IEEE Trans. Power Del.* 30 (6) (2015): 2527–2534.
- B. L. G. Jonsson and M. Gustafsson. “Stored energies in electric and magnetic current densities for small antennas”. *Proceedings of the Royal Society A Mathematical Physical and Engineering Sciences* (2015).
- S. Nordebo, G. Cinar, S. Gustafsson, and B. Nilsson. “Dispersion modeling and analysis for multilayered open coaxial waveguides”. *IEEE Trans. Microwave Theory Tech.* 63 (6) (2015): 1791–1799.

2014

- D. Colombi, B. Thors, and B. L. G. Jonsson. “Efficient whole-body SAR assessments by means of surface scan measurements”. *IEEE Transactions on Electromagnetic Compatibility*, 56 (3) (2014).
- S. Nordebo, M. Gustafsson, B. Nilsson, and D. Sjöberg. “Optimal realizations of passive structures”. *IEEE Trans. Antennas Propagat.* 62 (9) (2014): 4686–4694.
- I. Vakili, M. Gustafsson, D. Sjöberg, R. Seviour, M. Nilsson, and S. Nordebo. “Sum Rules for Parallel-Plate Waveguides: Experimental Results and Theory”. *IEEE Trans. Microwave Theory Tech.* 62 (11) (2014): 2574–2582.

Preprints

2017

- O. Björkqvist, O. Dahlberg, G. Silver, C. I. Kolitsidas, O. Quevedo-Teruel, and B. L. G. Jonsson. *Wireless Sensor Network Utilizing RF Energy Harvesting for Smart Building Applications*. 1st prize winner in AP-S student design competition 2016., 2017.
- M. Dalarsson, S. Nordebo, D. Sjöberg, and R. Bayford. *Absorption and optimal plasmonic resonances for small ellipsoidal particles in lossy media*. 2017.
- C. Ehrenborg and M. Gustafsson. *Fundamental limitations on MIMO antennas*. 2017.

- F. Ferrero, L. Lizzi, B. L. G. Jonsson, and L. Wang. *A Two-element Parasitic Antenna Approaching the Minimum Q-factor at a Given Directivity*. 2017.
- M. Gustafsson and C. Ehrenborg. *State-space models and stored electromagnetic energy for antennas in dispersive and heterogeneous media*. 2017.
- J. Helander, A. Ericsson, M. Gustafsson, T. Martin, D. Sjöberg, and C. Larsson. *Imaging using Compressive Sensing Techniques for Planar Non-Destructive Testing at 60 GHz*. 2017.
- Y. Ivanenko, M. Gustafsson, B. L. G. Jonsson, A. Luger, B. Nilsson, and S. Nordebo. *Passive approximation and optimization*. 2017.
- B. L. G. Jonsson, S. Shi, L. Wan, F. Ferrero, and L. Lizzi. *On methods to determine bounds on the Q-factor for a given directivity*. 2017.
- A. Luger and M. Nedic. *An integral representation for Herglotz-Nevanlinna functions in several variables*. 2017.
- J. Malmström, H. Holter, and B. L. G. Jonsson. *On the accuracy of equivalent antenna representations*. 2017.
- K. Schab, L. Jelinek, M. Capek, C. Ehrenborg, D. Tayli, G. Vandenbosch, and M. Gustafsson. *Energy Stored by Radiating Systems*. 2017.
- B. Xu, M. Gustafsson, S. Shi, K. Zhao, Z. Ying, and S. He. *RF EMF Exposure Compliance of mmWave Array Antennas for 5G User Equipment Application*. 2017.

2016

- M. Capek, M. Gustafsson, and K. Schab. *Minimization of Antenna Quality Factor*. 2016.
- B. L. G. Jonsson and M. Gustafsson. *Stored energies for electric and magnetic current densities*. 2016.

Conference papers

2017

- P. I. Bantavis, C. Kolitsidas, B. L. G. Jonsson, T. Empliouk, and G. A. Kyriacou. “A Wideband Switched Beam Antenna System for 5G Femtocell Applications”. In: *Accepted to Antennas and Propagation (APSURSI), 2017 IEEE International Symposium on*. 2017.
- O. Björkqvist, C. I. Kolitsidas, O. Dahlberg, G. Silver, M. Mattsson, and B. L. G. Jonsson. “A Novel Efficient Multiple Input Single Output RF Energy Harvesting Rectification Scheme”. In: *Accepted to Antennas and Propagation (APSURSI), 2017 IEEE International Symposium on*. 2017.

O. Dahlberg, C. I. Kolitsidas, M. Mattsson, G. Silver, O. Björkqvist, and B. L. G. Jonsson. “A Novel 32 Port Cube MIMO Combining Broadside and Endfire Radiation Patterns for Full Azimuthal Coverage - A Modular Unit Approach for a Massive MIMO System”. In: *Accepted to Antennas and Propagation (APSURSI), 2017 IEEE International Symposium on*. 2017.

M. Dalarsson, S. Nordebo, and D. Sjöberg. “Optimal plasmonic resonances for small arbitrarily shaped particles in lossy media”. In: *Submitted to URSI GASS, Montreal 2017*. 2017.

Y. Ivanenko and S. Nordebo. “Passive approximation and optimization with B-splines”. In: *Submitted to URSI GASS, Montreal 2017*. 2017.

Y. Ivanenko and S. Nordebo. “Passive approximation of dielectric spectroscopy data with B-splines and convex optimization”. In: *Submitted to Nord-IS, Västerås 2017*. 2017.

C. I. Kolitsidas, P. I. Bantavis, G. A. Kyriacou, and B. L. G. Jonsson. “Utilizing Periodic Structure Loading on Wideband Antenna Arrays for Next Generation Base Station Applications”. In: *Accepted to Antennas and Propagation (APSURSI), 2017 IEEE International Symposium on*. 2017.

A. Ludvig-Osipov and B. L. G. Jonsson. “Electric Polarizability Estimation For Planar Frequency Selective Arrays”. In: *Accepted to URSI GASS, Montreal 2017*. 2017.

M. Mattsson, C. I. Kolitsidas, G. Silver, O. Björkqvist, O. Dahlberg, and B. L. G. Jonsson. “A high gain Dual-Polarised Differential Rectenna for RF Energy Harvesting”. In: *Accepted to Antennas and Propagation (APSURSI), 2017 IEEE International Symposium on*. 2017.

S. Nordebo, M. Dalarsson, Y. Ivanenko, D. Sjöberg, and R. Bayford. “Parameter studies on optimal absorption and electrophoretic resonances in lossy media”. In: *Submitted to URSI GASS, Montreal 2017*. 2017.

S. Shi, L. Wang, and B. L. G. Jonsson. “On Q-Factor Bounds for a Given Front-to-Back Ratio”. In: *Accepted to Antennas and Propagation (APSURSI), 2017 IEEE International Symposium on*. 2017.

G. Silver, C. I. Kolitsidas, O. Björkqvist, M. Matsson, O. Dahlberg, and B. L. G. Jonsson. “Exploiting Antenna Array Configurations for Efficient Simultaneous Wireless Information and Power Transfer”. In: *Accepted to Antennas and Propagation (APSURSI), 2017 IEEE International Symposium on*. 2017.

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O. Björkqvist, O. Dahlberg, G. Silver, C. Kolitsidas, O. Q. Teruel, and B. Jonsson. “Wireless Sensor Network Utilizing RF Energy Harvesting for Smart Building Applications”. In: *Antennas and Propagation (APSURSI), 2016 IEEE International Symposium on*. **1:st price at IEEE APS student design contest**. 2016.

- C. Ehrenborg and M. Gustafsson. “Physical bounds and automatic design of antennas above ground planes”. In: *Electromagnetic Theory (EMTS), 2016 URSI International Symposium on*. IEEE. 2016, pages 233–235.
- M. Gustafsson. “Antenna current optimization and optimal design”. In: *Antennas and Propagation (ISAP), 2016 International Symposium on*. IEEE. 2016, pages 132–133.
- M. Gustafsson. “State-space models for stored energy and Q-factors”. In: *Electromagnetic Theory (EMTS), 2016 URSI International Symposium on*. Helsinki, 2016, pages 226–228.
- J. Helander, D. Sjöberg, and D. Tayli. “On the issue of simulating very large end-fire arrays with complex antenna geometries”. In: *Electromagnetic Theory (EMTS), 2016 URSI International Symposium on*. Helsinki, Aug. 2016, pages 737–740.
- J. Helander, A. Ericsson, D. Sjöberg, M. Gustafsson, T. Martin, and C. Larsson. “60 GHz imaging of panels for defect detection using planar scanning”. In: *Antennas and Propagation (APSURSI), 2016 IEEE International Symposium on*. 2016.
- Y. Ivanenko and S. Nordebo. “Approximation of dielectric spectroscopy data with Herglotz functions on the real line and convex optimization”. In: *2016 International Conference on Electromagnetics in Advanced Applications (ICEAA)*. IEEE. 2016, pages 863–866.
- Y. Ivanenko and S. Nordebo. “Estimation of complex valued permeability of cable armour steel”. In: *2016 URSI International Symposium on Electromagnetic Theory (EMTS 2016)*. IEEE. 2016, pages 830–833.
- B. L. G. Jonsson and M. Gustafsson. “Antenna Q based limitations for small and non-small structures”. In: *Electromagnetics in Advanced Applications (ICEAA), 2016 International Conference on*. IEEE. 2016, pages 776–779.
- B. L. G. Jonsson and M. Gustafsson. “On multi-dimensional systems; properties of their transfer functions”. In: *Electromagnetic Theory (EMTS), 2016 URSI International Symposium on*. IEEE. 2016, pages 512–514.
- B. L. G. Jonsson and M. Gustafsson. “Stored Energies for Electric and Magnetic Sources, Comparison with Chu’s Antenna Q”. In: *Antennas and Propagation (EuCAP), 2016 10th European Conference on*. IEEE. 2016.
- C. I. Kolitsidas and B. L. G. Jonsson. “Cross-Polarization Degradation in Array Antennas Employing Asymmetrical Elements and Possible Improvements”. In: *Antennas and Propagation (APSURSI), 2016 IEEE International Symposium on*. IEEE. 2016.
- C. I. Kolitsidas and B. L. G. Jonsson. “Polarization aspects on a wideband antenna array based on asymmetrical elements”. In: *Antennas and Propagation (EuCAP), 2016 10th European Conference on*. IEEE. 2016, pages 1–3.
- J. Malmstrom, H. Frid, and B. L. G. Jonsson. “Approximate methods to determine the isolation between antennas on vehicles”. In: *Antennas and Propagation (APSURSI), 2016 IEEE International Symposium on*. IEEE. 2016, pages 131–132.
- B. Nilsson, A. Ioannidis, Y. Ivanenko, and S. Nordebo. “On absence of sources at infinity and uniqueness for waveguide solutions”. In: *2016 International Conference*

on *Electromagnetics in Advanced Applications (ICEAA)*. IEEE. 2016, pages 780–783.

S. Nordebo, M. Stumpf, and Y. Ivanenko. “A 4-D FFT approach to parametric boundary integral equations for helical structures”. In: *2016 URSI International Symposium on Electromagnetic Theory (EMTS 2016)*. IEEE. 2016, pages 218–221.

S. Shi, A. Ludvig-Osipov, and B. L. G. Jonsson. “Examination of bandwidth bounds of antennas using sum rules for the reflection coefficient”. In: *Microwave and Millimeter Wave Technology (ICMMT), 2016 IEEE International Conference on*. Volume 1. IEEE. 2016, pages 226–229.

D. Sjöberg. “On sum rules for scattering in circular polarization”. In: *URSI International Symposium on Electromagnetic Theory, (EMTS)*. IEEE. 2016, pages 654–656.

B. Xu, J. Helander, A. Ericsson, Z. Ying, S. He, M. Gustafsson, and D. Sjöberg. “Investigation of planar near-field measurement of millimeter-wave antenna for 5G application”. In: *Antennas and Propagation (ISAP), 2016 International Symposium on*. 2016, pages 600–601.

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C. Ehrenborg, J. Fridén, and G. Kristensson. “Investigation and Comparison between Radiation Center and Phase Center for Canonical Antennas”. In: *EuCap*. 2015.

M. Gustafsson. “Physical bounds on metamaterials”. In: *9th International Congress on Advanced Electromagnetic Materials in Microwaves and Optics - Metamaterials, 2015-09-10*. 2015.

B. L. G. Jonsson. “On bounds of the impedance matching bandwidth for antennas”. In: *Electromagnetics in Advanced Applications (ICEAA)*. IEEE. Turin, Italy, 2015.

B. L. G. Jonsson and M. Gustafsson. “Antenna Q for small antennas with radiation constraints and perturbations”. In: *Antennas and Propagation (EuCAP), 2015 9th European Conference on*. IEEE. 2015, pages 1–3.

C. Kolitsidas and B. L. G. Jonsson. “Adaptive Null Steering Using Model Predictive Control Scheme”. In: *Antennas and Propagation Society meeting, Vancouver*. 2015.

S. Nordebo. “Cylindrical multipole expansion for helical structures”. In: *Modern Mathematical Methods in Science and Technology (M3ST), Kalamata, Greece, 30 August-1 September 2015*. 2015.

D. Sjöberg. “Time domain characterization of circular polarization selective structures”. In: *Electromagnetics in Advanced Applications (ICEAA), 2015 International*. 2015.

D. Tayli and M. Gustafsson. “Antenna Q-factor Calculation Using the MoM Impedance Matrix”. In: *9th European Conference on Antennas and Propagation (EUCAP 2015), 2015-04-12*. 2015.

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- M. Gustafsson. “Optimal antenna currents”. In: *International Conference on Electromagnetics in Advanced Applications (ICEAA)*, 2014-08-04. IEEE, 2014.
- M. Gustafsson. “Stored energy and current optimization”. In: *URSI General Assembly and Scientific Symposium*, 2014-08-16/2014-08-23. 2014.
- M. Gustafsson and B. L. G. Jonsson. “An overview of stored electromagnetic energy”. In: *International Conference on Electromagnetics in Advanced Applications (ICEAA)*, 2014-08-06. IEEE, 2014.
- B. L. G. Jonsson and M. Gustafsson. “Polarizabilities and Fundamental Bounds on Antennas”. In: *Electromagnetics in Advanced Applications (ICEAA) 2014 International Conference on*. 2014.
- B. L. G. Jonsson and C. Kolitsidas. “On methods to estimate bandwidth performance for array antennas with ground plane”. In: *The XXXI General Assembly of the International Union of Radio Science (URSI GASS XXXIth) August 18-22*. 2014.
- C. Kolitsidas and B. L. G. Jonsson. “Edge Effects in a Strongly Coupled Dipole Element Array in Triangular Lattice”. In: *PIERS Proceedings, Guangzhou*. Best student paper award. 2014, pages 487–490.
- C. Kolitsidas and B. L. G. Jonsson. “Rectangular vs. equilateral triangular lattice comparison in a T-slot loaded strongly coupled dipole array”. In: *General Assembly and Scientific Symposium (URSI GASS), XXXIth URSI*. 2014, pages 1–4.
- C. Kolitsidas, B. L. G. Jonsson, P. Persson, and A. Stjerman. “Exploiting asymmetry in a capacitively loaded strongly coupled dipole array”. In: *Antennas and Propagation Conference (LAPC), Loughborough*. 2014, pages 723–726.
- D. Sjöberg, N. Wellander, and A. Ericsson. “A homogenization procedure for microstructured resistive sheets”. In: *General Assembly and Scientific Symposium (URSI GASS), 2014 XXXIth URSI*. 2014, pages 1–4.
- D. Sjöberg, S. Nordebo, and M. Gustafsson. “Convex optimization for optimal realization of material properties”. In: *International Conference on Electromagnetics in Advanced Applications (ICEAA)*, 2014-08-03/2014-08-08. IEEE, 2014.
- I. Vakili, M. Gustafsson, and D. Sjöberg. “Sum rules for metamaterials in parallel plate waveguides”. In: *General Assembly and Scientific Symposium (URSI GASS), 2014 XXXIth URSI*. 2014, pages 1–4.

Conference contributions

2017

- M. Gustafsson. “Antenna Current Optimization and Optimal Design for Small Antennas”. In: *11th European Conference on antennas and Propagation*. 2017.
- M. Gustafsson and M. Capek. “Minimum Q-factors for antennas”. In: *11th European Conference on antennas and Propagation (EuCAP)*. 2017.

B. L. G. Jonsson, F. Fabien, and L. Lizzi. “Antenna Q Bounds for a Given Directivity: a Case Study of a Directive Parasitic Element Antenna”. In: *Antennas and Propagation (EuCAP), 2017 11th European Conference on*. 2017.

B. L. G. Jonsson, S. Shi, and L. Wang. “Relaxation of some non-convex constraints for Q-factor optimization”. In: *Accepted to URSI GASS, Montreal 2017*. 2017.

2016

M. Gustafsson. “Antenna current optimization and physical bounds for small antennas”. In: *2016 International Workshop on Antenna Technology (iWAT)*. 2016.

M. Gustafsson. “Antenna current optimization, stored energy, and modes for small antennas”. In: *IEEE International Symposium on Antennas and Propagation*. 2016.

M. Gustafsson. “Herglotz Functions and Sum Rules for Passive Systems”. In: *SIAM Conference on Mathematical Aspects of Materials Science*. 2016.

M. Gustafsson. “State-Space Approach to Stored Electromagnetic Energy in Dispersive Media”. In: *10th European Conference on antennas and Propagation (EuCAP 2016)*. 2016.

M. Gustafsson. “State space models for the stored electromagnetic energy and antenna Q-factor in lossy and dispersive media”. In: *IEEE International Symposium on Antennas and Propagation*. 2016.

Y. Ivanenko and S. Nordebo. “Cylindrical multipole expansion for periodic sources with applications for three-phase power cables”. In: *Swedish Microwave Days, Linköping*. 2016.

M. Nedic. “Om klassen av randmått av Herglotz-Nevanlinna funktioner i två variabler”. In: *Svenska matematikersamfundets höstmöte, November 18*. 2016.

S. Nordebo. “Parametric boundary integral equations for helical structures”. In: *Swedish Microwave Days, Linköping*. 2016.

D. Sjöberg and M. Gustafsson. “Determination of Optimal Performance of Electromagnetic Devices Using Convex Optimization”. In: *SIAM Conference on Mathematical Aspects of Materials Science*. 2016.

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G. Cinar, S. Aksimsek, B. Nilsson, S. Nordebo, and O. Y. Cinar. “Wiener-Hopf analysis of TM wave reflection by a step discontinuity on the junction of two coaxial waveguides with perfectly conducting and impedance walls”. In: *Progress in Electromagnetics Research Symposium (PIERS), Prague, Czech Republic, 6-9 July 2015*. 2015.

C. Ehrenborg, J. Fridén, and G. Kristensson. “Investigation and Comparison between Radiation Center and Phase Center for Canonical Antennas”. In: *Progress in Electromagnetics Research Symposium (PIERS)*. 2015.

- C. Ehrenborg and M. Gustafsson. “Stored Electromagnetic Energy in Bi-isotropic Media”. In: *Progress in Electromagnetics Research Symposium (PIERS)*. 2015.
- A. Ericsson and D. Sjöberg. “Sum Rules and Physical Bounds on Frequency Selective Structures”. In: *Progress in Electromagnetics Research Symposium (PIERS), Prague, July 6–9*. 2015.
- M. Gustafsson. “An Overview of Stored Electromagnetic Energy”. In: *9th European Conference on antennas and Propagation (EuCAP 2015), 2015-04-14*. 2015.
- M. Gustafsson. “Antenna and current optimization for antennas in lossy media”. In: *IEEE International Symposium on Antennas and Propagation, 2015-07-20*. 2015.
- M. Gustafsson. “Stored electromagnetic energy expressed in the fields, currents, and input impedance”. In: *IEEE International Symposium on Antennas and Propagation, 2015-07-20*. 2015.
- Y. Ivanenko and S. Nordebo. “Estimation of electromagnetic parameters of cable steel”. In: *Progress in Electromagnetics Research Symposium (PIERS), Prague, Czech Republic, 6-9 July 2015*. 2015.
- B. L. G. Jonsson. “Antenna Q and D/Q bounds for small antennas with electric and magnetic sources”. In: *PIERS Prauge*. 2015.
- B. L. G. Jonsson. “On multidimensional passivity in electrodynamics”. In: *PIERS Prauge*. 2015.
- M. Nedic. “Limit properties of Nevanlinna functions”. In: *Svenska matematikersamfundets höstmöte, November 20*. 2015.
- S. Nordebo, M. Gustafsson, and D. Sjöberg. “Passive Approximation and Optimization”. In: *Progress in Electromagnetics Research Symposium (PIERS), Prague, Czech Republic, 6-9 July 2015*. 2015.
- S. Nordebo and Y. Ivanenko. “Periodic Green’s dyadics for helical current distributions”. In: *Progress in Electromagnetics Research Symposium (PIERS), Prague, Czech Republic, 6-9 July 2015*. 2015.
- D. Sjöberg and S. Nordebo. “Convex optimization for approximations of positive real functions”. In: *Progress in Electromagnetics Research Symposium (PIERS), Prague, Czech Republic, 6-9 July 2015*. 2015.
- M. Stumpf and S. Nordebo. “Pulsed EM field propagation in cylindrically layered structures”. In: *Progress in Electromagnetics Research Symposium (PIERS), Prague, Czech Republic, 6-9 July 2015*. 2015.

2014

- B. L. G. Jonsson. “Bandwidth limitations and trade-off relations for wide- and multi-band array antennas over a ground plane”. In: *PIERS, Guangzhou, China*. 2014.