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Prof. Mats Gustafsson

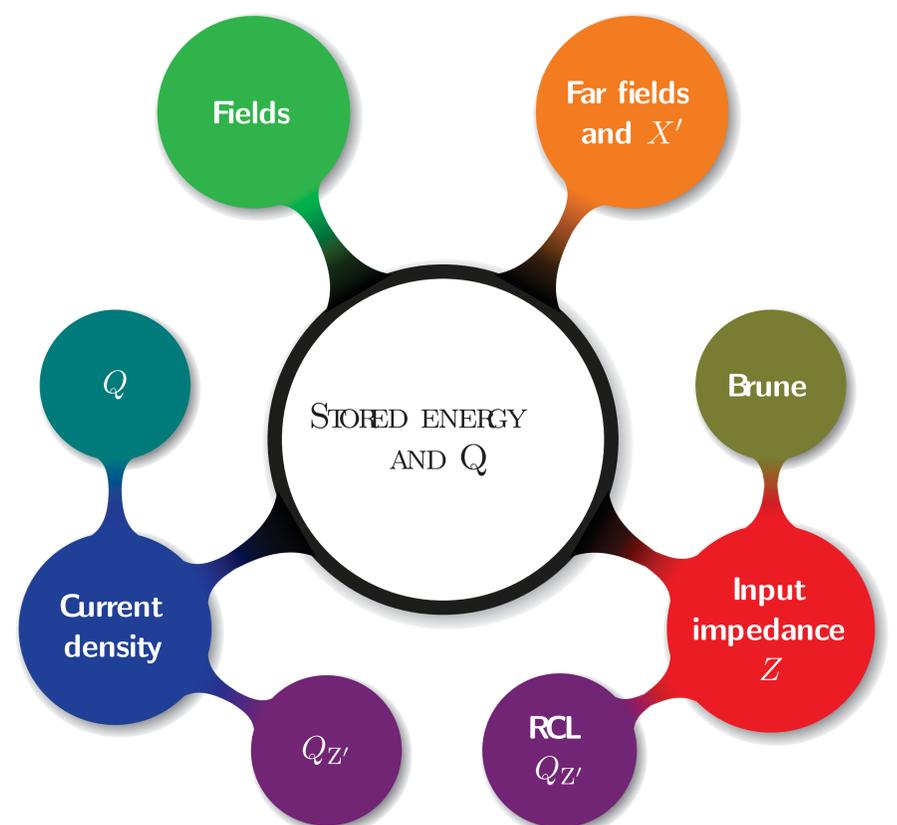
Convex Optimization for Analysis of Small Antennas

When: 5th October 2015 at 2:30 p.m.

Where: Technicka 2, Prague 6, room no. B2-621

Design of small antennas is challenging as the Q-factor, efficiency, and radiation resistance must be controlled simultaneously. In this presentation, it is shown that convex optimization together with closed form expressions of the stored electromagnetic energies provide a general method for analyzing many fundamental antenna problems. The solution to the convex optimization problem determines optimal currents, offers insight for antenna design, and presents performance bounds for antennas.

We present optimization formulations for the maximal gain Q-factor quotient, minimal Q for superdirectivity, and minimal Q for given far field. The effects of antennas embedded in metallic structures and effects of losses are also discussed. Results are shown for various antenna geometries and compared to state of the art designs. It is also shown that many antennas perform almost optimally. A tutorial description of a method of moment implementation together with a Matlab package for convex optimization to determine optimal current distributions on arbitrarily shaped antennas is also presented.



Prof. Mats Gustafsson

Prof. Mats Gustafsson received the M.Sc. degree in Engineering Physics in 1994, the Ph.D. degree in Electromagnetic Theory in 2000, was appointed Docent in 2005, and Professor of Electromagnetic Theory 2011, all from Lund University, Sweden. He co-founded the company Phase holographic imaging AB in 2004.

His research interests are in scattering and antenna theory and inverse scattering and imaging with applications in microwave tomography and digital holography. He has written over 60 peer reviewed journal papers and over 75 conference papers. Prof. Gustafsson received IEEE Schelkunoff Transactions Prize Paper Award 2010.