

# Shape optimization in Electromagnetics

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The functionality of nanoantennas in waveguide applications as well as the optical properties of nanoparticles are depending on their shapes. To optimize these properties, we are looking at shape optimization in the context of electromagnetics. Shape optimization includes the PDE-constraint minimization of a specific objective functional by variation of the domain. A major step to a shape optimization algorithm is the derivation of the shape gradient. Due to the lack of regularity one has to consider how the shape gradient can be used to get an admissible domain deformation. To verify the shape optimization algorithm, it is applied to Poisson's equation in 3D on simple domains where analytical solutions exist. The two applications mentioned above come along with different objective functionals and domain configurations, which are also discussed in the talk.