3-Dimensional Eigenmodal Analysis in Plasmonic Nano-Structures

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The 3-dimensional electromagnetic eigenmodal solver Femaxx has been extended to cover the analysis of plasmonic nano-optical structures. The solver adopts the finite element method, and has been optimized for distributed memory parallel computers. Absorbing boundary conditions (ABC) are used to model resonant structures in unbounded space. The solver is capable of analyzing quite general geometries and material properties. It solves large-size nonlinear eigenproblems with excellent accuracy. Two examples are presented to demonstrate the performance of the method. First, nanospheres are analyzed to validate the method. Then, a realistically modeled optical dimer is studied in detail, and we also access its capability for the application in advanced biosensing.