Comparison of numerical methods for the analysis of plasmonic structures

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Using some simple plasmonic structures, we compare various numerical methods operating in time domain and frequency domain. Both domain discretization and boundary discretization techniques are considered, namely finite differences in time domain (FDTD), finite element methods (FEM), boundary integral equation methods (BIEM), multiple multipole program (MMP), method of auxiliary sources (MAS). We show typical difficulties, ways to overcome them, advantages and disadvantages of the different methods as well as variants of FEM, BIEM, and MMP.