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Optimization and parallelization of an electromagnetic field FDTD-based solver on asymmetrical 2D grid

Finite-Difference Time-Domain method of electromagnetic field computation often requires significant amount of time and memory resources, which emphasizes the necessity for the development of high-performance programs. In this paper, we present enhancements to the performance of an electromagnetic field solver using the FDTD method on an asymmetric grid. The improvement in efficiency was achieved by exploring potential optimizations related to the specific features and capabilities of the Julia language, as well as employing multithreading and CUDA. To evaluate the effectiveness of computations, we compared the performance of the optimized solver with its previous version and a commercial solution –COMSOL Multiphysics.

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