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Study on acceleration technique for ADI-FDTD algorithm based on GPU. (Chinese. English summary) [Zbl 1175.68516](#)

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Summary: With the advancement of Graphics Processing Unit (GPU) and the creation of its new feature of programmability, it has come possible to transfer some of the processing stages in general numerical algorithms from CPU to GPU in order to accelerate the computation. In this paper, starting from a brief introduction to Alternative Direction Implicit Finite Difference Time Domain (ADI-FDTD) algorithm, detailed introduction and analysis are given to the fundamentals and the key technique of GPU for accelerating ADI-FDTD computation, in combination with the implementation frame of the conjugate gradient method for solving linear equations system on GPU. Finally, some computed examples are presented, and various comparisons are made to prove the efficiency and accuracy of this acceleration approach.

MSC:

[68U10](#) Computing methodologies for image processing

Keywords:

graphics processing unit (GPU); programmable pipeline; conjugate gradient method; numerical calculation

Software:

Cg; OpenGL

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