

## A CFD SOLVER ON GRAPHICAL PROCESSING UNITES FOR TURBULENCE SIMULATIONS

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The focus of the current paper is the development of a finite volume computational fluid dynamics solver on the Graphical Processing Unites(GPUs) using CUDA Fortran for turbulence simulations. The solver is implemented with an AUSM scheme for the spatial discretization and the SST  $k-\omega$  model for turbulence model. Several test cases, such as 2D NACA 0012 airfoil, a supersonic mixing layer, and hypersonic inlet flow are chosen to demonstrate the acceleration performance of GPU on multi-million grid cells . Results show that the computational expense can be reduced by 20~32 times when using a NVIDIA Tesla K20x GPU as compared to a single core of an Intel Xeon 2687w CPU.

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