

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Grid-point requirement for large eddy simulation: Chapman's estimation revisited¹ HAECHEON CHOI, Seoul National University, PARVIZ MOIN, Stanford University — Resolution requirements for large eddy simulation (LES), estimated by Chapman [AIAA J. Vol. 17, p. 1293 (1979)], are modified using accurate formulae for high Reynolds number boundary layer flow. This correction indicates that the number of grid points (N) required for wall-modeled LES is proportional to $Re_L^{2/7}$, but a wall-resolving LES requires $N \sim Re_L^{13/7}$, where L is the flat-plate length in the streamwise direction. The number of grid points required for the flow over an aircraft using LES with and without modeling the viscous wall region is estimated: the number of grid points for the wall-modeled LES is one to three orders of magnitude smaller than that for the wall-resolving LES, indicating the practical importance of wall modeling in LES for high Reynolds number flows.

¹This work is conducted while HC takes a sabbatical year at Stanford University.

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Date submitted: 02 Aug 2011

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