

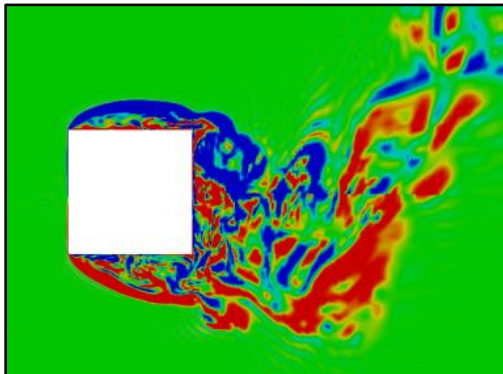
# LES study of high-Re flow past a square cylinder by using structured and unstructured grids

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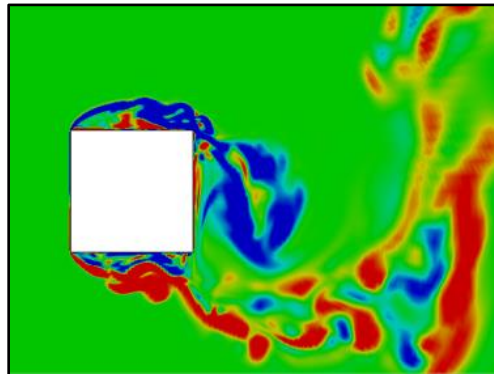
**Objectives:** Based on the flow past a square cylinder at  $Re=2.2e4$ , the accuracy of LES on structured and unstructured grids is assessed.

**Contents:** Such high-Re flow past a square cylinder involves a complex development: flow separation, formation of shear layers, generation and downstream travel of Karman. The flow is simulated based on structured and unstructured grids respectively. Various numerical aspects are examined.

**Results:** Based on the same grid, the flow on structured-grid is predicted well. The unstructured-grid LES fairly accurately estimate the low-order statistical moments, but fails to reproduce the high-frequency velocity components among others. Such problems can be improved by more sensible meshing strategy for unstructured grids.



Structured-grid LES



Unstructured-grid LES

**Computer:** SX-ACE  
**Vector ratio:** 99%  
**Memory used:** 60 GB  
**Parallel:** 1 node