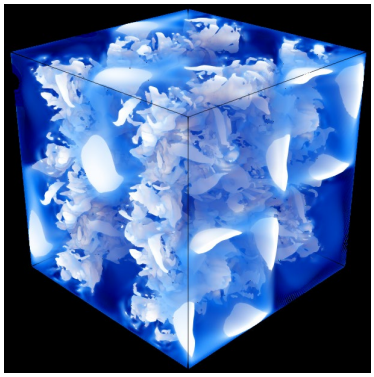
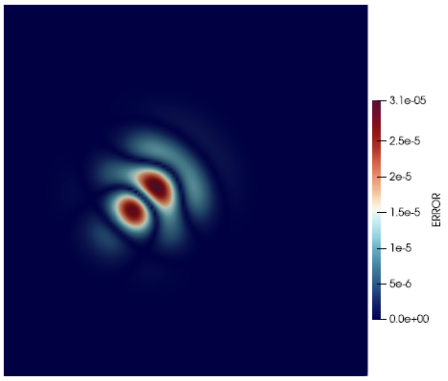
An Efficient high-order accurate parallel solver for large eddy simulation of turbulent flows

Graphical Abstract/ Lavout





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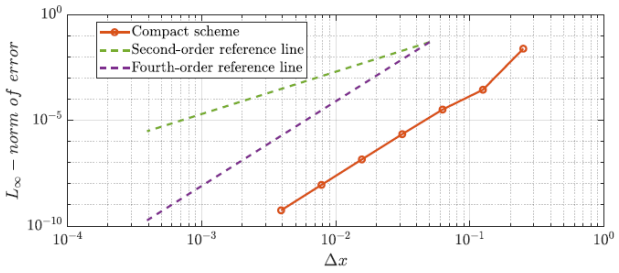
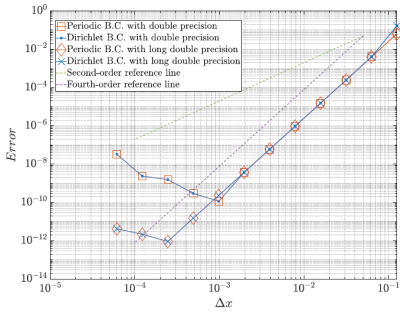
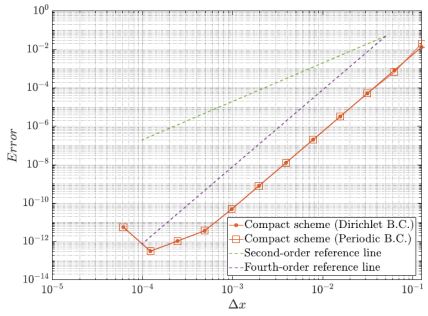
Project Description:

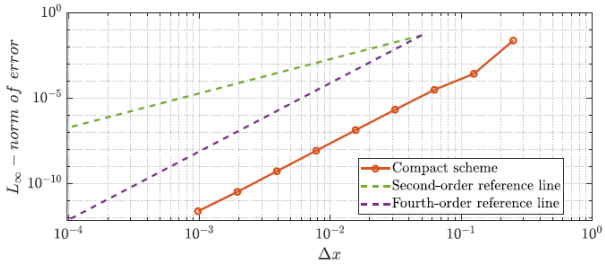
In recent years, the affordability of modern supercomputers has fundamentally changed the design and analysis phases of industrial components. Numerical simulations increasingly replace costlier and time consuming wind tunnel or other experimental testing procedures. With the increasing sophistication of engineering components, modelling them with high accuracy is essential. Experts view Large-eddy simulations (LES) as the future of reliably modelling engineering applications. This project aims to develop an open-source, efficient, and high-accurate LES solver to simulate high Reynolds number turbulent flows. in this project, compact finite difference schemes will be utilised to achieve high-order accuracy, while the recently developed single time-stepping artificial compressibility methods and GPU parallelisation will be used for computational efficiency. The developed has been validated against standard bench mark problems like Taylor Vortex, attached and separated boundary layer flows.

Products/ Instruments/ Results/ Outreach Activities (Pictures)









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Name of the Funding Agency
Science and Engineering Research Board (SERB)

Name of the Scheme
Core Rsearch Grant (CRG)

Sanctioned Amount (in Rupees)
Rs. 11,35,401

Duration of the Project (years)
3