FM24S_11256

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Optimization of an Implicit Subgrid-Scale Model for LES

S. Hickel[(1)], S. Franz[(1)], N.A. Adams[(1)], P. Koumoutsakos[(2)]

(1) *Dresden University of Technology, Institute of Fluid Mechanics, Dresden, Germany*
(2) *ETH Zuerich, Institute of Computational Sciences, Switzerland*

The presentation gives a summary of the derivation of an implicit subgrid-scale model for LES which is obtained from a new approach for the approximation of hyperbolic conservation laws. Adaptive local deconvolution is performed using a quasi-linear solution-adaptive combination of local interpolation polynomials. The physical flux function is substituted by a suitable numerical flux function. The truncation error has physical significance and effectively acts as subgrid-scale model. It can be determined by a modified-differential-equation analysis and is adjustable through free parameters.Computational results for Burgers equation show that the model with parameters identified by evolutionary optimization give significantly better results than other models.

View the extended summary