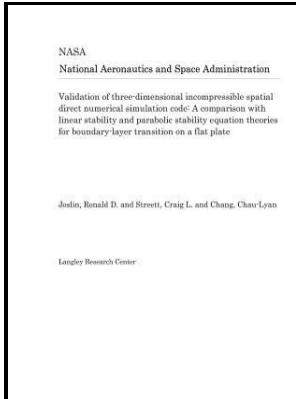


Validation of three-dimensional incompressible spatial direct numerical simulation code - a comparison with linear stability and parabolic stability equation theories for boundary-layer transition on a flat plate

Langley Research Center - NUMERICAL SIMULATION OF LINEAR AND NONLINEAR DISTURBANCE EVOLUTION IN A BOUNDARY LAYER WITH COMPLIANT WALLS



Description: -

Navier-Stokes equation

Boundary layer transitionValidation of three-dimensional incompressible spatial direct numerical simulation code - a comparison with linear stability and parabolic stability equation theories for boundary-layer transition on a flat plate

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Tags: #Verification #and #Validation #Issues #in #Hypersonic #Stability #and #Transition #Prediction

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The second code UPS , originally developed for a perfect gas, has been extended to permit either perfect gas, equilibrium air, or nonequilibrium air computations. Here, the DNS results are used to critically evaluate the results obtained using parabolized stability equations PSE theory and.

Verification and Validation Issues in Hypersonic Stability and Transition Prediction

If the equation is completely degenerate, we show that the stability of solutions can be established just based on the partial boundary condition. For such interventions, a quantified dose is vital if the treatment is to be both biologically effective and to avoid the detrimental effects of over-dosing.

Spatial direct numerical simulation of boundary

The flow solver uses the Parabolized Navier-Stokes equations to compute millions of mesh points in several minutes.

Active Control of Instabilities in Laminar Boundary Layers—Overview and Concept Validation

For many practical applications a single well-ordered i. Although a mathematically complete method for controlling arbitrary instabilities has been developed but not yet tested , the review, duplication, and physical explanation of previous studies are important steps for providing an independent verification of those studies, for establishing a framework for subsequent work which will involve automated transition control, and for detailing the phenomena by-which the automated studies can be used to expand knowledge of flow control.

NUMERICAL SIMULATION OF LINEAR AND NONLINEAR DISTURBANCE EVOLUTION IN A BOUNDARY LAYER WITH COMPLIANT WALLS

The upwind version leads to higher accuracy in both steady and unsteady computations than the previously used central-difference method does, while the increase in the computational time is small.

[PDF] Validation Of Three Dimensional Incompressible Spatial Direct Numerical Simulation Code A Comparison With Linear Stability And Parabolic Stability Equation Theories For Boundary Layer Transition On A Flat Plate Download eBook Full

The checkerboard zebra algorithm is applied to solution of the three dimensional continuity equation in conservative form. An approximate factorization is obtained that is correct to first order in the commutator of the depth operators.

NUMERICAL SIMULATION OF LINEAR AND NONLINEAR DISTURBANCE EVOLUTION IN A BOUNDARY LAYER WITH COMPLIANT WALLS

Visually and statistically indistinguishable blurred images are presented, with vastly different deblurring results. The advantage of the inversion algorithm is twofold.

Active Control of Instabilities in Laminar Boundary Layers—Overview and Concept Validation

The numerical procedure is then used to study the influence of the initial disturbance amplitude on the disturbance development for a tensioned membrane.

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