

Visitor Research Report

Visitor Name: Professor Hua Shan
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Area of Research: Numerical Simulations of Laminar-Turbulent
Transitions

Period of Visit: December 29 – 30, 2008

Goal:

To enhance the collaboration with the Computational Aerosciences Branch of NASA LaRC in conducting numerical simulation and data analysis for instability wave propagation in fully 3D boundary layers.

Strategy:

Through discussion in person has been very helpful and efficient in resolving problems in existing simulation, clarifying all the details of the linear stability/PES data, and setting up new DNS study cases.

Accomplishments:

The existing results of DNS/LES study of transition over a flat-plate and roughness induced instability over a circular cone has been briefly summarized and discussed.

The linear stability/PES data has been collected together with the data defining the computational domain for both temporal- and spatial-growth of crossflow instability waves over a swept wing. The data have been used to generate the grid, base flow, and initial condition (for temporal-growth) or upstream boundary condition (for spatial-growth case) that will be used by DNS study.

Future Work:

Test and debug the new DNS cases for temporal- and spatial-growth of crossflow instability waves over a swept wing. Conduct data analysis for the flat-plate and cone simulations.

Pending Publications:

The research work may lead to two conference/journal papers.

Seminar Presented: N/A