UNIVERSITÀ DEGLI STUDI DELLA BASILICATA

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Università degli Studi della Basilicata

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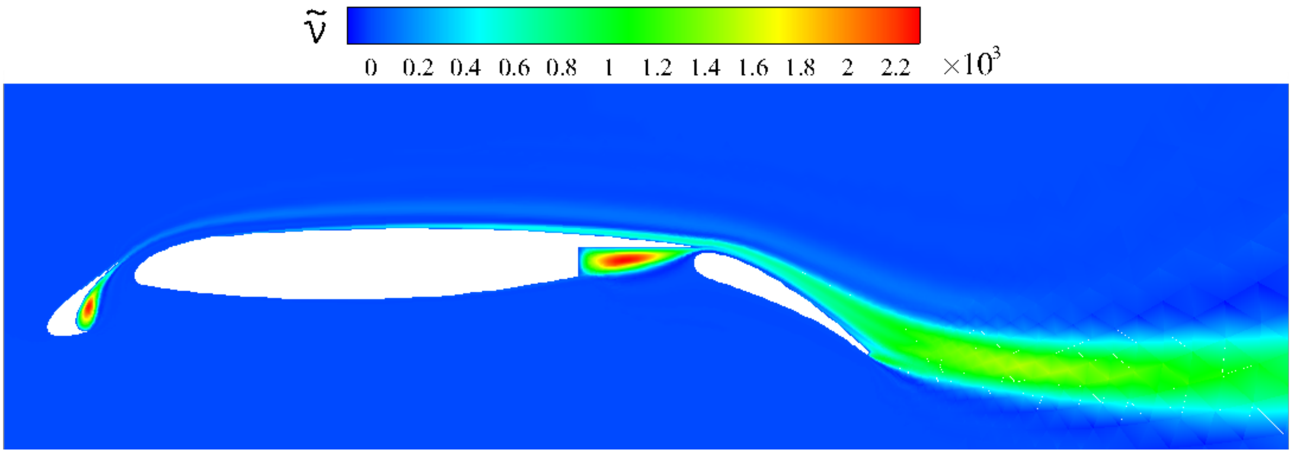
High-Order Accurate Finite-Volume Methods in Computational Aerodynamics

Abstract

The Advanced Numerical Simulation Laboratory at UBC focuses on algorithm development for CFD, with an application focus in compressible aerodynamics. We are currently working in three main areas: numerical methods for flow solution on unstructured meshes; generation of unstructured meshes; and the interaction between mesh quality and solution accuracy. We use unstructured meshes to be able to handle complex geometries, and high-order accurate finite-volume methods to get very accurate answers.

This talk will describe our high-order accurate flow solver, with an emphasis on numerical methodology. I will start by describing the numerical basis for high-order finite-volume methods on unstructured meshes, as well as our approach for RANS simulations. The second half of the talk will cover our recent work on error quantification and reduction, including (to our knowledge) the first finite-volume based h-p adaptation scheme.



Carl Ollivier-Gooch received his MSc and PhD in Aeronautics and Astronautics from Stanford University. After post-doctoral training at NASA Ames Research Center and the US Department of Energy Argonne National Laboratory, he joined the Department of Mechanical Engineering at The University of British Columbia in 1997. In addition to winning several awards for his research activities, Carl has won the UBC Killam Teaching Prize and was co-ordinator of the department's award-winning second-year undergraduate program for four years.