West Texas A&M University

Yong Yang, Ph.D.
Assistant Professor of Mathematics

Research Areas and Expertise

Numerical Analysis and Computational Fluid Dynamics

Contact

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Mathematics

Wind Turbine Research Interest

Dr. Yang is currently working on two projects: 1) direct numerical simulation (DNS) to transitional flow (incompressible flow); 2) large eddy simulation (LES) to shock/boundary layer interaction (compressible flow). Both of them use numerical methods to solve Navier-Stokes equations. DNS is able to resolve more details of flow field and has highest fidelity, but it needs more computing resources. LES uses some sub-grid models to simulate the small scale vortices and computes the large scale vortices directly. The computing costs of LES is cheaper, but it still has relatively high fidelity. In past years, researchers are increasingly using LES because of its relatively less expense and ability to better predict the atmospheric boundary layer and the wake behind wind turbines. In summary, Dr. Yang would like to provide wind turbine CFD results by LES.

Professional Profile

Dr. Yang joined the School of Engineering, Computer Science, and Mathematics in 2017. He received a B.S. in Aircraft Design and Engineering from Nanjing University of Aeronautics and Astronautics in 2011, an M.S. in Applied Mathematics from University of Texas at Arlington in 2016 and a Ph.D. in Applied Mathematics from University of Texas at Arlington in 2017.

Academic Research

Dr. Yang's research interests are applications in numerical analysis, especially in computational fluid dynamics. His recent researches include direct numerical simulation for turbulent flow and large eddy simulation for shock/boundary-layer interaction.

Education

- University of Texas at Arlington, Arlington, TX, Applied Mathematics, 2017 - Ph.D.
- University of Texas at Arlington, Arlington, TX, Applied Mathematics, 2016 - M.S.
- Nanjing University of Aeronautics and Astronautics, Nanjing, China, Aircraft Engineering and Design, 2011 - B.S.

Publications

Book

- Liu, C., Li, Q., Yan, Y., Yang, Y., Yang, G., Dong, X. (2017). High Order Large Eddy Simulation for Shock-Boundary Layer Interaction Control by a Micro-ramp Vortex Generator Bentham Science.

Refereed Articles

- Wang, Y., Yang, Y., Yang, G., & Liu, C. (2017). DNS Study on Vortex and Vorticity in Late Boundary Layer Transition. Communications in Computational Physics., doi: 10.4208/cicp.OA-2016-0183.
- Yang, Y., Yan, Y., & Liu, C. (2016). ILES for Mechanism of Ramp-Type MVG Reducing Shock Induced Flow Separation. SCIENCE CHINA Physics, Mechanics & Astronomy., doi:10.1007/s11433-016-0348-2.
- Liu, C., Wang, Y., & Yang, Y. (2016). New Omega Vortex Identification Method. SCIENCE CHINA Physics, Mechanics & Astronomy., doi: 10.1007/s11433-016-0022-6.
- Yang, Y., Tang, J., Yan, Y., & Liu, C. (2015). DNS Study on Mechanism of Flow Chaos in Late Boundary Layer Transition. Chaotic Modeling and Simulation Journal.

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Mathematics

Publications (Continued)

Refereed Proceedings

- Tian, S., Gao, Y., Liu, C., & Yang, Y. (2018). DNS study on large vortex ring formation in late flow transition. 2018 AIAA Aerospace Sciences Meeting.
- Yang, Y., Tian, S., & Liu, C. (2018). POD Analyses on Vortex Structure in Late-stage Transition. 2018 AIAA Aerospace Sciences Meeting, AIAA.
- Dong, X., Yan, Y., Yang, Y., & Liu, C. (2018). Frequency Investigation on Unsteadiness of Shock-Vortex Ring Interaction. 2018 AIAA Aerospace Sciences Meeting, AIAA.
- Dong, X., Yan, Y., Dong, Y., Yang, Y., & Liu, C. (2018). LES Study on Structure Characteristics of Shock/Vortex Ring Interaction. 2018 AIAA Aerospace Sciences Meeting.
- Yang, Y., Tian, S., & Liu, C. (2017). Observation of the development of -vortex to hairpin vortex packet. 55th AIAA Aerospace Sciences Meeting, AIAA.
- Dong, X., Yang, Y., Tang, J., & Liu, C. (2017). LES Study on Unsteadiness of Shock Boundary Layer Interaction. 55th AIAA Aerospace Sciences Meeting, AIAA.
- Dong, Y., Dong, X., Yang, Y., & Liu, C. (2017). Numerical Investigation on the Oblique Shock and High-speed Vortex Rings Interaction. 55th AIAA Aerospace Sciences Meeting, AIAA.
- Dong, Y., Yang, Y., & Liu, C. (2017). DNS Study on Three Vortex Identification Methods. 55th AIAA Aerospace Sciences Meeting, AIAA.
- Tang, J., Yang, Y., & Liu, C. (2017). Line Box Relaxation Method and Multigrid Acceleration for Simulation of 2-D Jet Flow in a Channel. 55th AIAA Aerospace Sciences Meeting, AIAA.
- Aldujaly, H., Yang, Y., & Liu, C. (2017). Weighted Upwinding Compact Scheme for Shock Capturing. 55th AIAA Aerospace Sciences Meeting.
- Yang, Y., Tian, S., Dong, X., & Liu, C. (2017). Spectrum analysis of SWBLI under ramp-type MVG control. 55th AIAA Aerospace Sciences Meeting, AIAA.
- Yang, Y., Tang, J., & Liu, C. (2016). LES Analysis on Shock-Vortex Ring Interaction. 54th AIAA Aerospace Sciences Meeting.
- Wang, Y., Yang, Y., Chern, S., & Liu, C. (2016). DNS Study on Motion around a Vortex Ring in Transitional Boundary Layers. 54th AIAA Aerospace Sciences Meeting.
- Tang, J., Yang, Y., Yan, Y., & Liu, C. (2015). DNS Study on Role of Linearly Unstable Modes in Flow Transition. 53rd AIAA Aerospace Sciences Meeting.
- Yang, Y., Yan, Y., & Liu, C. (2015). LES Study on Mechanism of Reduction of Shock Induced Flow Separation by MVG. 53rd AIAA Aerospace Sciences Meeting.
- Yang, Y., Yan, Y., & Liu, C. (2015). Optimization of MVG Position for Control of Shock Boundary Layer Interaction. 53rd AIAA Aerospace Sciences Meeting.