AER 1316H: Introduction and Course Outline

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Course Text:
Fundamentals of Computational Fluid Dynamics, by H. Lomax, T.H. Pulliam, and D.W. Zingg, Springer-Verlag, 2001. (Available at the U. of T. textbook store.)

Reference Books:
Numerical Computation of Internal and External Flows, C. Hirsch, Vols. 1 & 2, Wiley, 1988.

Computational Fluid Mechanics and Heat Transfer, D.A. Anderson, J.C. Tannehill, and R.H. Pletcher, McGraw-Hill, 1984.

Mark Breakdown: Assignments 60%, final test 40%

There will be 4 assignments. Problems and due dates are posted on my web site. The final test will be type X, i.e. "open book."

Course Outline

1. Introduction
2. Conservation Laws and the Model Equations
3. Finite-Difference Approximations
4. The Semi-Discrete Approach
5. Finite-Volume Methods
6. Time-Marching Methods for ODE's
7. Stability of Linear Systems
8. Choice of Time-Marching Methods
9. Relaxation Methods
10. Multigrid
11. Numerical Dissipation
12. Split and Factored Forms
13. Linear Analysis of Split and Factored Forms