VISCOUS FLOW

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Course Introduction

- Lecture: Viscous Flow (M2794.008700)
- Professor: Wontae Hwang
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  - Email: wthwang@snu.ac.kr
  - Office hour: Tuesday & Thursday, after the class (till 17:00)
- Goals
  - This course introduces various viscous flow phenomena.
  - Specific cases where exact solutions are available, including canonical problems such as Couette and Poiseuille flows
  - Similarity solution methods to solve the various problems where the viscosity effect is important
  - Approximate methods and topics associated with the stability, transition, and turbulence

Course Introduction

- Textbook
  - Main
    - Fundamental Mechanics of Fluids (I. G. Currie), 3rd Ed., Marcel Dekker, Inc. (2003)
    - Supplementary materials – please check “eTL” before the class
  - References
    - Viscous Fluid Flow (F. White)
    - Boundary Layer Theory (H. Schlichting)
    - An Introduction to Fluid Dynamics (G. K. Batchelor)
    - Papers from archival journals
    - ETC.

Course Introduction

- Scope (schedule) – to be operated flexibly
  - REVIEWS: Flow Kinematics and Governing Equations
  - Exact Solutions: Couette flow, Poiseuille flow, Stoke's problems
  - Stagnation point flow, Channel flow
  - Low Reynolds Number flow
  - Midterm
  - Laminar boundary layers: Similarity
  - Blasius, Falkner-Skan solutions
  - Approximate integral solutions
  - Separation, Stability of boundary layers
  - Orr-Sommerfeld Equations
  - Transition to turbulence
  - Turbulent boundary layers, velocity profiles, integral analysis
  - Final Exam
- Evaluation
  - Attendance (10%), Homework (20%), Midterm (30%), Final (40%)