

# 高等流体力学 Advanced Fluid Mechanics

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辅导:

授课对象: 五系07级硕

授课时间: 2007年秋季

- **WHY** do we need to study the course: Advanced Fluid Mechanics?
- **WHAT** will we learn from this course?
- **HOW** do we study the course?

## References

- Batchler. *An Introduction to Fluid Dynamics*. Cambridge, 1967. 中译本: 《流体力学引论》。
- 庄礼贤, 尹协远, 马晖扬. 《流体力学》, 科大版, 本科教材。
- Panton. *Incompressible Flow*. John Wiley & Sons, Inc., 2005 (3rd ed.).
- Landau & Lifshitz. *Fluid Mechanics*. Pergamon, 1987 (2<sup>nd</sup> ed.). 理论物理教程卷6, 第1版有中译本, 科大老师翻译。
- Lame. *Hydrodynamics*, 1932(6<sup>th</sup> ed.). 中译本: 《理论流体力学》, 科学出版社。
- White. *Fluid Mechanics*. McGraw-Hill, 2003 (5th ed.). 清华大学出版社影印版. 适合工科, 附光盘。
- 吴望一: 《流体力学》(上下册), 北京大学出版社, 1982。
- 周光炯, 严宗毅, 许世雄, 章克本: 《流体力学》(上下册), 高等教育出版社(面向21世纪课程教材)(1991第1版, 2000第2版)
- 超星图书馆等网上图书馆
- 流体中文网<http://www.cfluid.com/index.htm>

## Purpose and requirement

- **Theoretical, basis of Computational Fluid dynamics (CFD) and Experimental fluid mechanics**
  - ◆ “Brain” and “two hands”
- **Successive course of “Elements of Fluid Mechanics”**
  - ◆ More extensive contents
  - ◆ Deeper understanding
- **Requirement for the course**
  - ◆ “Elements of Fluid Mechanics”. Similar courses such as “Aerodynamics” maybe OK.
  - ◆ If never, please take “Elements of Fluid Mechanics” this semester!
- **Ph.D qualifying course, but not necessary for M. E.**

## *Contents*

- **Chap 1. The Physical Properties of Fluids**
- **Chap 2. Kinematics of the Flow Field**
- **Chap 3. Equations Governing the Motion of a Fluid**
- **Chap 4. Flow of a Uniform Incompressible Viscous Fluid**
- **Chap 5. Flow at large Reynolds number: Effects of Viscosity**
- **Chap 6. Irrotational Flow Theory and its Applications.**
- **Chap 7. Flow of Effectively Inviscid Fluid with Vorticity**

流体力学基础中学习过的内容将较快讲解!

## *End of Preface*

## *Suggestions for study of the course*

- **Notes!**
- **Reading**
- **Derivation: do it by yourself !**
- **Homeworks: 20%-30%**
- **Final exam:70%-80%**