Numerical Simulation of Turbulent Flows - LES

شبیه‌سازی عددی جریان‌های آشفته

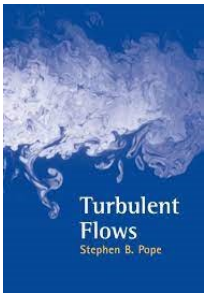
Contents

سرفصل

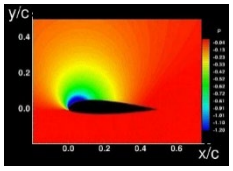
Main References

Books

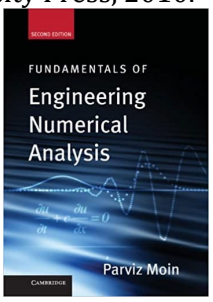
[1] Pope, S.B., Turbulent flows, Cambridge University Press, 2000.



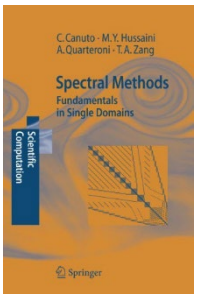
[2] Davidson, L., Fluid mechanics, turbulent flow and turbulence modeling, Course notes: Chalmers University of Technology, 2023.

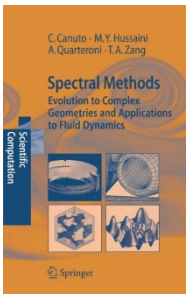


[3] Moin, P., Fundamentals of engineering numerical analysis, Cambridge University Press, 2010.

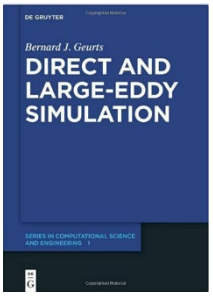


[4] Canuto, C., Hussaini, M.Y., Quarteroni, A., and Zang, T.A., Spectral methods, 2 volumes, Springer, 2007.

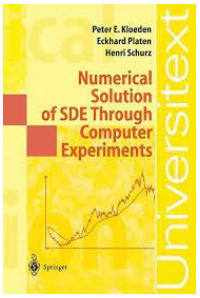




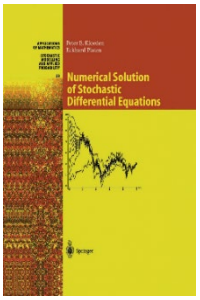
[5] Geurts, B.J., Direct and large-eddy simulation, De Gruyter, 2020.



[6] Kloeden, P.E., Platen, E., and Schurz, H., Numerical solution of SDE through computer experiments, Springer, 2002.



[7] Kloeden, P.E., and Platen, E., Numerical Solution of Stochastic Differential Equations, Springer, 1992.



Notes

[8] Notes on numerical simulation of turbulent flows, by B. Lessani, Amirkabir University of Technology

[9] Notes on LES of turbulent flows, by R. Stoll and J.A. Gibbs, University of Utah

Journals and papers

- Journal of computational physics (Journal, Elsevier)

Course material:
My github: https://github.com/ehsan-amani/Courses/tree/main/NSTF-LES

Websites
- Center of Turbulence Research (CTR), http://ctr.stanford.edu
- Johns Hopkins Turbulence DataBase (JHTDB), http://turbulence.idies.jhu.edu
- CFD of Multiphase flows group: https://sites.google.com/view/dramani

Other References

Books

- L. Davidson, An Introduction to Turbulence Models, 2018, Chalmers University of Technology.

Papers

- Morinishi, Yohei, et al. "Fully conservative higher order finite difference schemes for incompressible flow." Journal of computational physics 143.1 (1998): 90-124.

- Amani, Ehsan, Mohammad Bagher Molaei, and Morteza Ghorbani. "Novel mixed approximate deconvolution subgrid-scale models for large-eddy simulation." Physics of Fluids 36.8 (2024).

- Ham, F. E., F. S. Lien, and A. B. Strong. "A fully conservative second-order finite difference scheme for incompressible flow on nonuniform grids." Journal of Computational Physics 177.1 (2002): 117-133.

- Sauer, Timothy. "Numerical solution of stochastic differential equations in finance." Handbook of computational finance. Berlin, Heidelberg: Springer Berlin Heidelberg, 2011. 529-550.

Assessment

Homework	30%
Projects	50%
Final exam	20%

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