

Review of Analysis and Modeling Techniques for Incompressible, Turbulent Bluff-Body Wakes

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abstract here *LH&FZ*

Nomenclature

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ρ = density, kg/m^3

Subscripts

$()_{\infty}$ = freestream quantity

Acronyms

CFD = Computational Fluid Dynamics

I. Introduction

INTRO sentence to paper should have this fancy capitalization.
I. • Driving Physical Phenomena *FZ*

- differences from potential flow
- blunt/bluff body definition, differences from streamlined body flow
- massively separated flow
- base pressure
- wake

• Real World Applications *LH*

- parachute
- reentry capsule
- vehicles
- buildings
- show similarity between cylinder/sphere wake and more complex bluff body

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II. Experimental Methods And Results

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- Historical Study
- Experimental techniques
 - ballistic range?
- Applications
 - Simple cases: cylinder/sphere
 - * Drag vs Re?
 - * Wake velocity profiles?
 - * Wake structure?
 - Sharp vs bluff: sphere vs cube
 - Complex cases: capsule/building

III. Computational Methods and Results

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- Historical Study
- Computational techniques
- Applications
 - Simple cases: cylinder/sphere
 - Sharp vs bluff: sphere vs cube
 - Complex cases: capsule/building

A. Turbulence Modeling Aspects

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- Compare turbulence model performance for sphere/cylinder
 - SA
 - SST
 - SAS
 - URANS
 - LES
 - DES
 - DNS?

LIST ALL FIGURES HEAR, REORDER AND DESCRIBE LATER

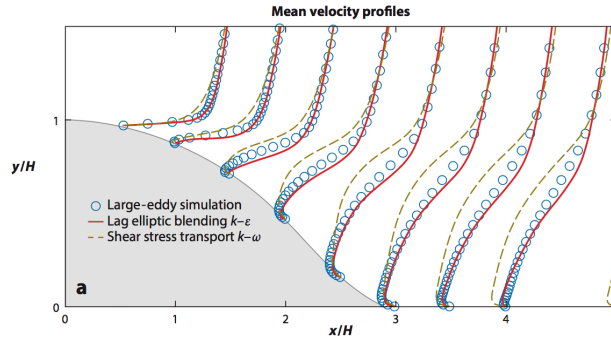


Fig. 1 curved backstep velocity profile les vs rans [1]

IV. Current State of Bluff-Body Turbulence Analysis

- Current State of Knowledge
- Remaining Challenges

A. Experimental Methods

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B. Computational Methods

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V. Conclusions

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Acknowledgments

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Example citations

[2]

References

- [1] Durbin, P. A., "Some Recent Developments in Turbulence Closure Modeling," *Annual Review of Fluid Mechanics*, Vol. 50, No. 1, 2018, pp. 77–103. doi:10.1146/annurev-fluid-122316-045020.
- [2] Nakamura, Y., "Bluff-body aerodynamics and turbulence," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 49, No. 1, 1993, pp. 65 – 78. doi:https://doi.org/10.1016/0167-6105(93)90006-A, URL <http://www.sciencedirect.com/science/article/pii/016761059390006A>.