## A High-Order Computational Framework for Simulating Flows around Rotating and Moving Objects

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# A High-Order Computational Framework for Simulating Flows around Rotating and Moving Objects

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### Dedication

I dedicate this work to xxx

## Acknowledgements

I would like to thank xxx

#### Abstract

# A High-Order Computational Framework for Simulating Flows around Rotating and Moving Objects

This work deals with xxx

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### Chapter 1: Introduction

#### 1.1 Backgrounds

#### 1.1.1 Engineering Background

In engineering, xxx [1]

#### 1.1.2 Numerical Background

Numerically, xxx

### 1.2 Objectives of this Work

In this work, xxx

#### References

[1] Van den Abeele, K., Lacor, C., Wang, Z. J., 2008. On the stability and accuracy of the spectral difference method. Journal of Scientific Computing 37, 162–188.