

C++ Template

A large, light gray watermark of the Andong National University logo is centered in the background. The logo is circular, featuring a stylized 'A' in the center, with the university's name in Korean and English around the perimeter.

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Contents

- **Abstract**
- **Introduction**
- **Examples**
- **Concluding Remarks**
- **Reference**

Abstract

Little C++:

- ❖ Mathematical notation for mesh.
- ❖ Explanation of template of C++
- ❖ Explanation for mesh
- ❖ Represent on of the code

Introduction

Template C++

- Functional and Class templates
- How to write it
- Explanation of theory
- Explanation of code

Reference

<https://www.math.colostate.edu/~bangerth/videos.676.12.html>

Basic concept

Code base for Mesh

Mathematical Notation looks like same in 1D and 2D

Quadrature

$$A_{ij} \approx \sum_K \sum_{q=1}^Q J_K^{-1}(\hat{x}_q) \hat{\nabla} \hat{\varphi}_i(\hat{x}_q) \cdot J_K^{-1}(\hat{x}_q) \hat{\nabla} \hat{\varphi}_j(\hat{x}_q) \underbrace{|\det J_K(\hat{x}_q)|}_{=: JxW} w_q$$

for (cell=begin; cell!=end; ++cell)
 apply d -dimensional quadrature formula
 to integrand on cell K

error indicator: $\eta_K^2 = \frac{h}{24} \left\| [\mathbf{n} \cdot \nabla u_h] \right\|_{\partial K}^2$

for (all cells)
 for (all faces of this cell)
 apply (d-1)-dimensional quadrature formula
 to jump term on this face

Conclusions

- ❑ Code explanation
- ❑ Mathematical interpretation
- ❑ Code for building

Thank You