Natural Convection from Isothermal Convex Bodies: Simple Models for Bounds on Body-Gravity Function

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Outline

- Introduction
  - item 1
  - item 2
- Objectives
- Model development
  - item 1
  - item 2
- Summary

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Introduction

- Intro #1

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Model Development

Upper Bound — P_{max}

D_{max}

Constant Area

P_{max}

Constant Area

g

Lower Bound — D_{max}
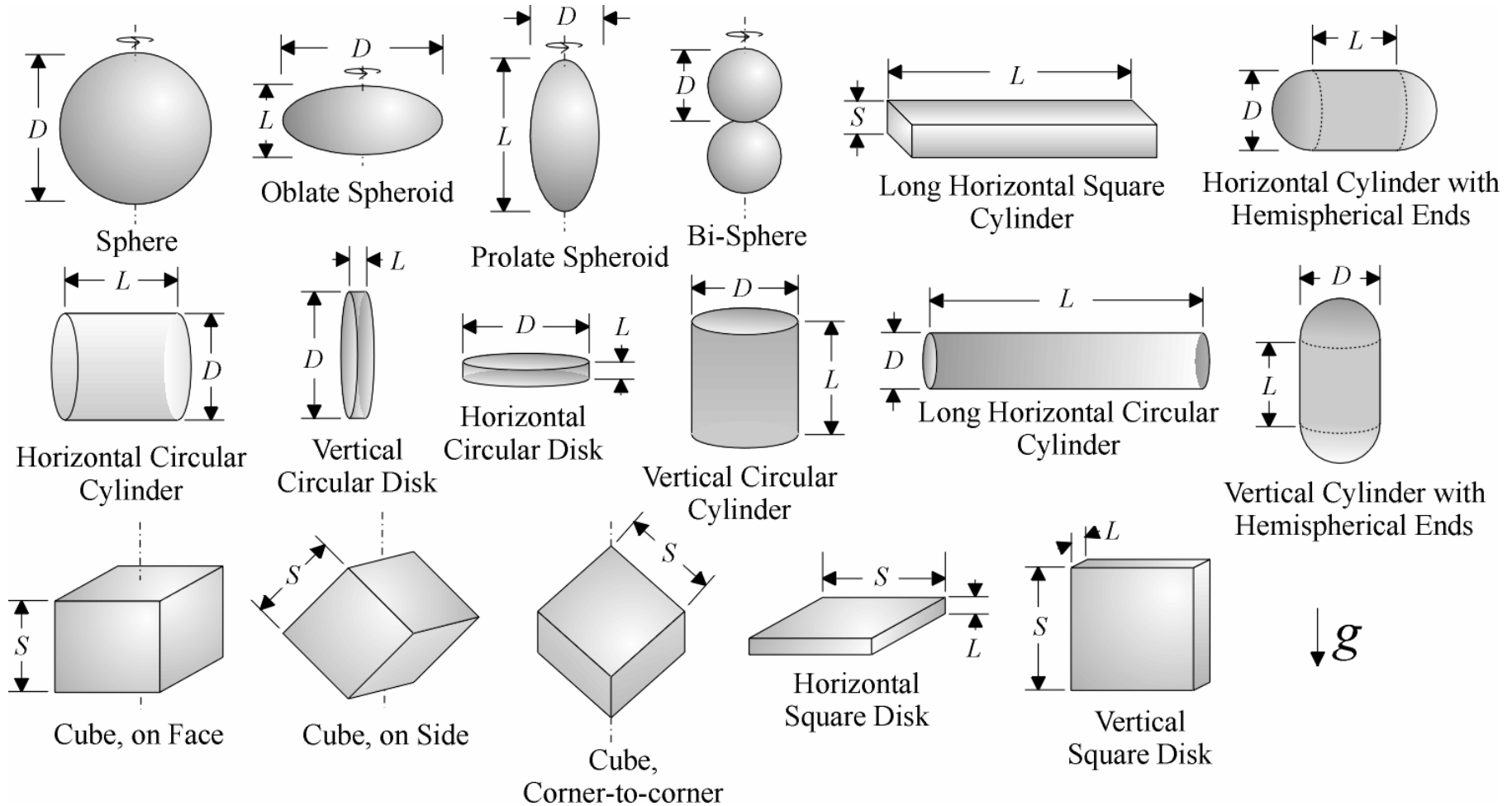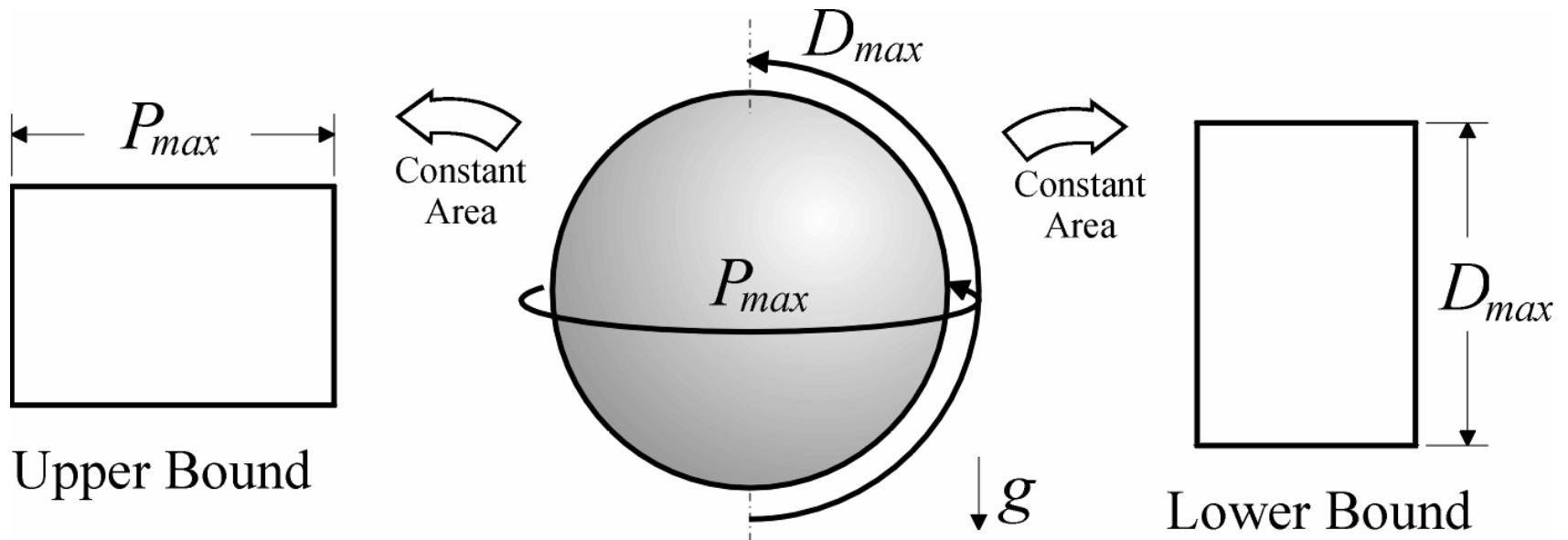
Sample of Equations

- Total gap heat transfer:

$$Q_g = \iint_{A_g} d\,Q_g = 2\,\pi\,k_g \int_a^b \frac{\Delta T_g(r)\,r\,dr}{t+M}$$

- Average gap conductance:

$$h_g = \frac{Q_g}{A_g\,\Delta T_j} = \frac{2\,k_g}{d_1+d_2} \int_a^b \frac{f(r)\,r\,dr}{r^2 + M\,b^2/(d_1+d_2)}$$

- Local gap temperature drop:

$$0 \le f(r) = \frac{\Delta T_g(r)}{\Delta T_j} \le 1, \quad a \le r \le b$$

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Summary

- Item #1

- Item #2

- Item #3

- Item #4

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