
Tutorial 5. Modeling Radiation and Natural Convection

Introduction

In this tutorial combined radiation and natural convection are solved in a two-dimensional square box on a mesh consisting of quadrilateral elements.

This tutorial demonstrates how to do the following:

- Use the radiation models in FLUENT (Rosseland, P-1, DTRM, discrete ordinates (DO), and surface-to-surface (S2S)) and understand their ranges of application.
- Use the Boussinesq model for density.
- Set the boundary conditions for a heat transfer problem involving natural convection and radiation.
- Separate a single wall zone into multiple wall zones.
- Change the properties of an existing fluid material.
- Calculate a solution using the pressure-based solver.
- Display velocity vectors and contours of stream function and temperature for flow visualization.

Prerequisites

This tutorial assumes that you are familiar with the menu structure in FLUENT and that you have completed Tutorial 1 . Some steps in the setup and solution procedure will not be shown explicitly.

Problem Description

The problem to be considered is shown schematically in Figure 5.1. A square box of side L has a hot right wall at $T = 2000$ K, a cold left wall at $T = 1000$ K, and adiabatic top and bottom walls. Gravity acts downwards. A buoyant flow develops because of thermally-induced density gradients. The medium contained in the box is assumed to be absorbing and emitting, so that the radiant exchange between the walls is attenuated by absorption and augmented by emission in the medium. All walls are black. The objective is to compute the flow and temperature patterns in the box, as well as the wall heat flux.

Tutorial 5 Modeling Radiation And Natural Convection

J Rink



Tutorial 5 Modeling Radiation And Natural Convection:

Tutorial 5 Modeling Radiation And Natural Convection Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has been apparent than ever. Its capability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Tutorial 5 Modeling Radiation And Natural Convection**," compiled by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we will delve into the book's central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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