The Department of Mechanical Engineering presents:

The Master's Dissertation Defense of:

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An Investigation of Natural Convection in a
Horizontal Concentric Annuli with Different Inner Shapes

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Dr. Kambiz Vafai, Chairperson

Abstract:

An investigation of free convection in a horizontal concentric annuli with different inner shapes where the inner and outer surfaces are kept at a constant temperature is presented. The simulation is categorized into four groups based on the shape of the inner entity which can be either cylindrical, elliptical, square or triangular. Flow and thermal fields are exhibited by means of streamlines and isotherms. Overall heat transfer correlations incorporating thermal radiation are established and presented in terms of the Nusselt numbers. It is observed that the surface radiation and existence of the corners and larger top space can enhance the heat transfer rate. As the reference temperature increases, surface radiation plays a more prominent role in the overall heat transfer performance.

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