

## Measurement of Convective Heat Transfer from a Vertical Flat Plate Using Mach-Zehnder Interferometer with Wedge Fringe Setting

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**Abstract :** Laser interferometric methods have been utilized for the measurement of natural convection heat transfer from a heated vertical flat plate, in the investigation presented here. The study mainly aims at comparing two different fringe orientations in the wedge fringe setting of Mach-Zehnder interferometer (MZI), used for the measurements. The interference fringes are set in horizontal and vertical orientations with respect to the heated surface, and two different fringe analysis methods, namely the stepping method and the method proposed by Naylor and Duarte, are used to obtain the heat transfer coefficients. The experimental system is benchmarked with theoretical results, thus validating its reliability in heat transfer measurements. The interference fringe patterns are analyzed digitally using MATLAB 7 and MOTIC Plus softwares, which ensure improved efficiency in fringe analysis, hence reducing the errors associated with conventional fringe tracing. The work also discuss the relative merits and limitations of the two methods used.

**Keywords :** Mach-Zehnder interferometer (MZI), natural convection, Naylor method, Vertical Flat Plate

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