APPLICATION OF OPTICAL SYSTEM TO DETECT FLOW PATTERN IN TWO-PHASE FLOW

Chengyi Ma
M.S.
Faculty Advisor: Dr. Keska

ABSTRACT

The objective measurement and detection of flow patterns in two-phase flow is not only one of the most significant problems in research but also absolutely necessary in aerospace, automobile, petroleum and chemical industry. The development of such methods and systems requires an identification of the dependent physical parameters, which are impacted by flow patterns. Any attempt to find such parameters and describe the relations is a progress in a way to find such system to detect flow patterns. This paper presents the results of an exploratory experimental research on two variations of optical system response to changes of three arbitrary chosen flow patterns and change of mixture viscosity. Further, the analysis of the results should provide guidance for next steps in the development of flow pattern detections and applicability of optical systems to this purpose. Evaluation of the application of optical system to detect flow patterns is based on conducted experimental research for two-phase flow in a vertical pipe, using two sets of optical systems to measure variations of interfacial phenomena caused by different flow patterns. Detailed analysis of the output signals in time, amplitude and frequency domains with the use of NI ELVIS (Educational Laboratory Virtual Instrumentation Suite), MatLab and LabView software will revile the impact of flow patterns on the resistance change of opto-detectors used in both optical systems.

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