

ABSTRACT

Owing to the necessity to meet the measurement requirements by the still not fully resolved current flow sensors, this paper proposes to develop a non-intrusive thermal flow measurement system for small diameters and low flow of air, based on concept of forced convection, in which a set of five PT100 temperature sensors and a heating resistor is installed on the outer surface of a pipe in order to obtain the thermal distribution in the pipe wall as the combined effect of heat generated by the resistor and cooling generated by the internal flow. It is desired to obtain the model of the thermal profile so as to reconstitute the temperature profile using only a few points. From the characteristics of the thermal distribution in the tube, the flow inference is done using the linear regression model and later in a similar manner using Artificial Neural Networks. The results showed that it is possible to develop a non-intrusive thermal flow meter is possible and that it is able to infer flow with full scale error lower than 3%

Keywords: Intelligent Sensor. Flow. Thermal. Non-intrusive. Neural Network. Modeling.