Title:

Parametric reduced order modeling applied to thermal property sensor.

Abstract:

A modeling approach based on reduced order modeling was proposed for a thermal property sensor. In contrast to the standard modeling approaches for these kinds of sensors, which are the analytical or the equivalent electrical circuit. The sensor was deployed for the measurement of the thermal conductivity (k) and the volumetric heat capacity (ρc_p) of gases and operates according to the temperature oscillation technique (TOT). In the current study, the applicability of a sensor model based on a reduced order modeling approach was investigated, intending to improve the performance of this sensor. For this reason a parametric model order reduction (para-MOR) technique using proper orthogonal decomposition was applied. The approach was tested experimentally, where the model was calibrated in two pure gases and evaluated in 21 gases and gas mixtures.

CV:

Anastasios Badarlis was born in Greece in 1982. In 2006, he received his Dipl-Ing. Mech. Eng. from Aristotle University of Thessaloniki with specialization on analysis and synthesis of structures. In 2008, he joined the R&D division at Endress+Hauser Flowtec AG in Switzerland. In parallel, since 2010 he has been pursuing a PhD degree at laboratory of Fluid Dynamics and Turbomachinery, Aristotle University of Thessaloniki. His research interests include numerical analysis, simulations, reduced order modeling, micro-sensors, gas property sensors, gas analyzers and thermal flow sensors.