Optimized Calibration Method for Analog Parametric Temperature Sensors

Oleksandr Vovna, Ivan Laktionov , Antonina Andrieieva , Eduard Petelin , Oleksandr Shtepa, Hanna Laktionova

The aim of the article is development of scientific and applied foundations for improving the accuracy of current measurement systems of temperature characteristics of technological processes by improving calibration methods of analog parametric temperature sensors. The article presents the developed and investigated improved mathematical model of determining characteristics of thermistor conversion based on the Steinhart-Hart equation. The possibility of calibrating thermistors using two reference points in an operating temperature range from 0 to 100ºC, with the interconnected choice of its values, is mathematically grounded and experimentally proved. The results of the studies have shown that the use of the proposed method can reduce the approximation uncertainty by 3 times compared with the existing approaches. Using the presented research results made it possible to synthesize a software component of information measurement systems to automate the calibration process of parametric resistive sensors. The obtained research results can be used as a scientific and practical basis for optimization and adaptation of metrological certification of resistive temperature sensors.

Keywords: *calibration model, thermistor conversion characteristic, measurement error, approximation function*