ABSTRACT

The sensing devices play an important role for various system automation and monitoring of different physical and chemical parameters. Nonlinearity is an important long-time issue for most of the sensors, so to compensate nonlinearity, various linearization schemes are reported in the literature. The accuracy of linearization schemes depends on the type and the nonlinearity value of the sensor output. In this work we study and analyze the hardware linearization of NTC thermistor using direct interfacing (DIT) on different commercially available microcontrollers and evaluate different parameters (non-linearity error, range, and sensitivity). The result shows that when we use Arduino Uno it gives maximum linearity range (0°C- 70°C) at 100nF with NLE<1%, on the other hand Arduino due gives maximum linearity range (0°C- 70°C) at 1nF with NLE<1% ESP32-S give maximum linearity range (0°C- 60°C) at 47nF and10nF. In low capacitance value Arduino Due give better linearity range and sensitivity approximate ≈ 67Ω/°C as compared to Arduino due and ESP32-S. But at high capacitance value Arduino Uno gives better linearity as compared to the other. So, results show that if you need high sensitivity, the linearity range decreases and if you need high linearity range, the sensitivity is disturbed.