The Study of Calibration for AD590 Analog Temperature Sensor

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ABSTRACT

This thesis studies the temperature calibration of AD590, product of Analog Device co. The conversion of voltage to temperature is based upon the assumption of constant value, (eight), to be the ratio of current densities. A precise setup is implemented to measure the output voltage of AD590. The ratios of current densities are measured and a function of current densities to absolute temperature is then obtained.

This study includes thermoelectric cooler and heat dissipation devices, which generate the needed temperatures, AD590 and the reference temperature generator, digital temperature and humidity sensor SHT75, and implemented inside the experimental setup. The study precise voltage measurements result in an experimental formula and its ratio of current densities.

Three sensors are tested, and the results show that the current density ratio will increase as the test temperature increases. The modified characteristic curve of sensors and the calibrated formula will then be obtained. Through the comparison of calibrated and original equations, the calibrated current density ratio increase 0.135% at 0°C, 0.265% at 10°C and 0.395% at 20°C. The performance curve of each sensor represents its characteristic, and it will enhance our understanding forward its performance. And therefore the temperature measurements will be more precise.

Keywords : AD590、Thermoelectric Cooler、Current density Ratio、characteristic curve

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