Electronic Temperature Control for a Sensor Testbench

Motivation

In robotics research field, sensors have an undeniable important role. This fact is well represented by the SeeGrip project, which has its emphasis in a feedback of tactile sensor data in order to control a manipulator to perform tasks in deep sea.

Due to the complexity of information needed to control this manipulator, sensor arrays have to be integrated into the structure. Therefore, different sensors technologies should be tested in a special testbench which is able to control the intensity and the position of forces to be applied on the sensors.

However, when talking about almost any kind of sensors, one undesired characteristic always arises: Temperature influence on measuring. The necessary knowledge to comprehend the behaviour of sensors when submitted to different temperatures is essential to achieve the expected results for a project being developed.

Aiming to completely describe the behaviour of the sensors and rightly understand the data coming from them, the testbench temperature should be monitored as well as controlled. A system responsible for controlling the testbench temperature will be developed, being possible to process sensor array information with as less as possible temperature influences.

Objectives

This Bachelor Thesis is divided into three subgoals:

- Development of a printed circuit board able to control the sensor test bench temperature. This temperature control will be accomplished by using modules (e.g. Peltier modules) responsible for generating the heat or cooling the sensors. Development of a hardware interface which allows the user to set temperatures (e.g. by using buttons and a display).
- Software development regarding to control the heat flow. Sending and receiving data via an interface (e.g. USB interface).
- Test and evaluation of the temperature control system.

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