

Temperature Regulator Project Proposal

Project Overview

The idea being proposed for this project is a temperature regulator that checks the current ambient temperature and adjusts the speed of a DC fan accordingly. It will have two modes: Manual and Automatic. In the Manual mode, the user can control the speed the fan spins. In the Automatic mode, the system will calculate the error between the current and user-set temperature, then will use this value to determine the fan's speed. The system will also include an LCD.

Sensors and Actuators

The temperature regulator will consist of three sensors: a potentiometer, a push button, and a thermistor. The potentiometer, in Manual mode, allows the user to set the fan speed. The push button allows the user to switch between the Manual and Automatic modes. In the Automatic mode, the thermistor records the current temperature while the user uses the potentiometer to set his or her desired temperature.

This system will also include an actuator and an output device. The actuator will be a 4-pin PWM-controlled DC fan. Pins 1, 2, and 4 will be used on the fan to provide power, grounding, and a PWM signal that controls fan speed (the tachometer signal pin will not be used). The LCD shows the user which mode is currently active, the current temperature, and the user-set temperature.

Processing

An Arduino microcontroller will be used to carry out all computational and processing tasks. Its first task will be to sense the current temperature by mapping the thermistor output value into Fahrenheit. It will also map the temperature-control knob position (potentiometer) to a specific temperature defined by the user, then adjust the fan speed accordingly. There will be an attached interrupt function for the button push to toggle the mode between automatic and manual, accounting for button bounce. The appropriate temperatures and system mode will be displayed to the connected LCD.