

Temperature Fan

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Computational Methods 200

Abstract

In this experiment I measured the temperature of any given room and then regulated it using a fan. I did this by setting the value of the room temperature to a variable and once the temperature sensor read above that value it would turn on the fan. In the experiment I used my hand to increase the temperature after the room temperature was taken. I did this to allow the fan to turn on and cool down the sensor back to the room temperature. Once the temperature sensor read back to the correct value the fan would turn off. This process repeats to create a temperature regulator using the fan.

Code

The code below begins by setting the values that are needed throughout the code. It adds a shield that is used for the motor shield that is attached and used for the arduino. I then add the section that has the calibration for the temperature sensor that takes an average for 5 seconds. It then moves to activating the dc motor that acts as a fan all in a while loop. In the loop it takes the value of the temperature sensor and when it goes above that value it turns on the fan and then when it goes below the value the fan turns off. The last part of the code creates a graph that displays a real time graph of the temperature as it changes. The graph pops up as a figure that includes labels for the axis and the title.

Methods and Materials

The materials used for this project was a DC motor, an Arduino Uno Rev3, TMP36 temperature sensor, 1k resistors, jumper wires, cardboard, tape, paper and breadboard. The software used was MATLAB.

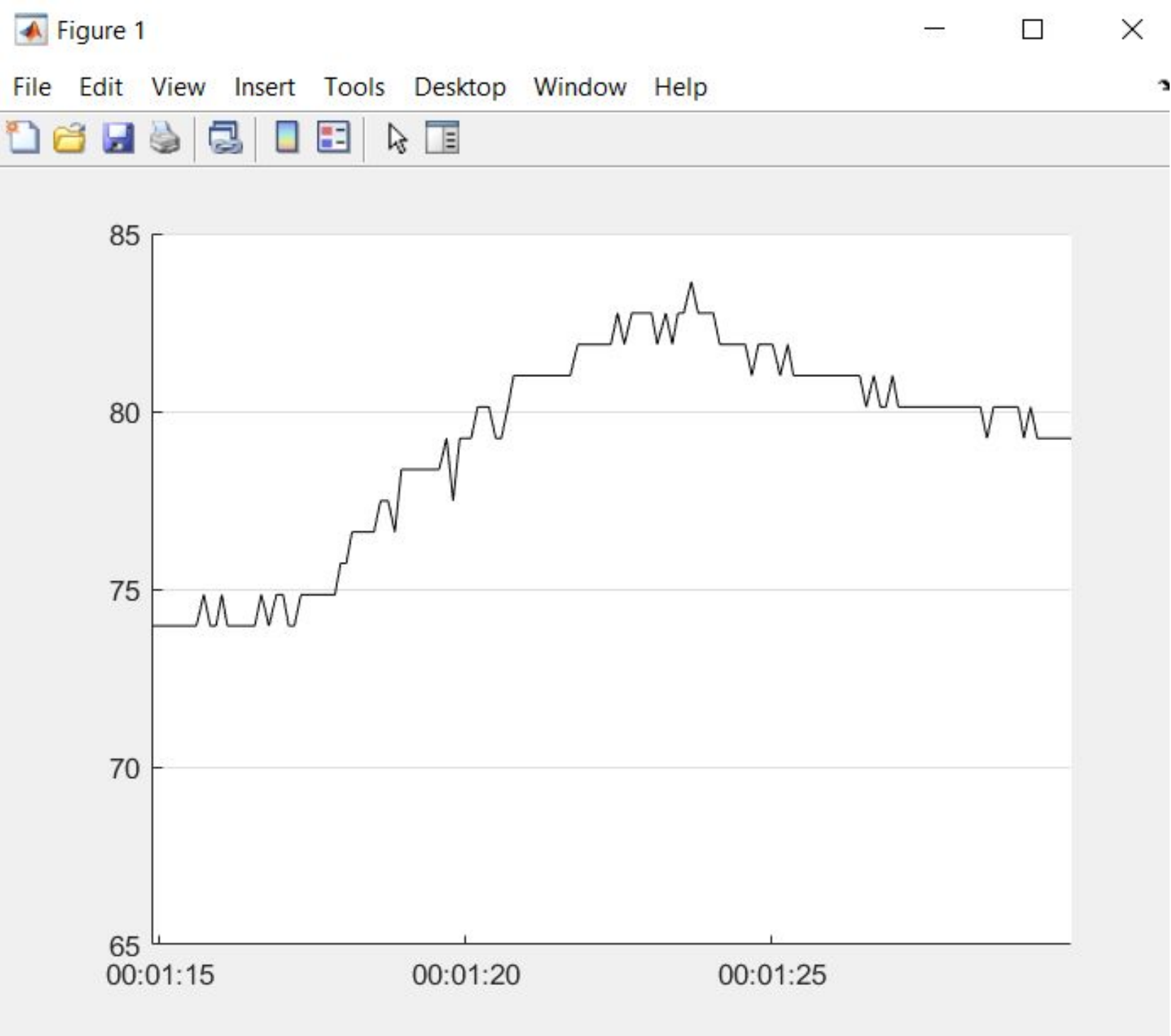
The first step in this process was to create the circuit using the jumper wires and the temperature sensor. I started by creating a simple code that read the temperature using the sensor. I then added the dc motor to activate when the temperature sensor read a certain temperature. Once the circuit was fully working and the code was running, a fan was created to add onto the motor and a stand was made. To finalize the code up, a calibration code was added to set a value for the room temperature. Additionally, a real time graph was added to measure the time as it regulates.

Results

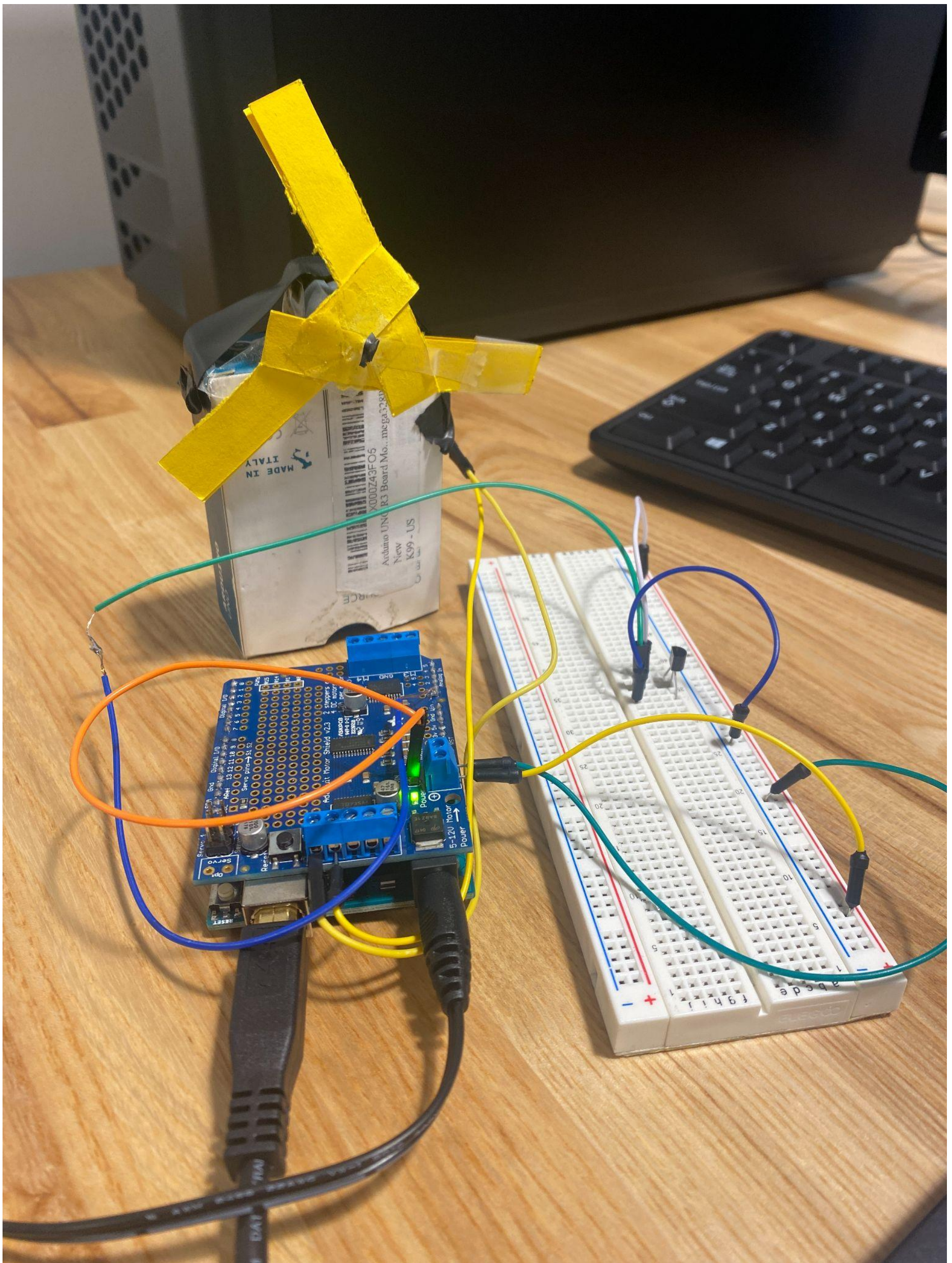
The results of this experiment are shown in the graph that is attached. It shows that the temperature fluctuates as the fan cools down the sensor when it gets too hot.

```

4 = clear;
5 a = arduino;
6 addOnShield = addOn(a,'AdafruitMotorShieldV2');
7 dcMotorObject = dcmotor(addOnShield, 1);
8 starttime = datetime('now');
9
10 %% Calibration
11 ii = 0;
12 tempF = zeros(1e4,1);
13 t = zeros(1e4,1);
14
15 tic
16 while toc < 5
17     ii = ii + 1;
18     % Read current voltage value
19     v = readVoltage(a,'A0');
20     % Calculate temperature from voltage (based on data sheet)
21     TempC = (v - 0.5)*100;
22     tempF(ii) = 9/5*TempC + 32;
23     % Get time since starting
24     t(ii) = toc;
25 end
26 x = tempF/5;
27 %% Motor
28 figure
29 h = animatedline;
30 ax = gca;
31 ax.YGrid = 'on';
32 ax.YLim = [65 85];
33 i = 1;
  
```



This is the real time graph that measures the temperature as the fan cools the temperature down as it gets too hot.



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