Determine if current sensor circuit resolves a linear relationship between current and voltage output by the op-amp. ADC’s not available. Used multimeter connected to op-amp Vout and Arduino ground with gator clips. Arduino UNO supplied 3V3 and 5V power. Used Agilent power supply to provide current. Soldered ~20 gauge wire to terminals of hall-effect sensor to attach supply to.

3v3 from UNO 30A

|  |  |  |
| --- | --- | --- |
| Current | Voltage (Measured twice Oct12) | Voltage(Oct 14) |
| 0 | 3.22, 3.206 | 3.248 |
| 0.2 | 3.21, 3.198 |  |
| 0.4A (0.07V) | 3.205, 3.184 | 3.227 |
| 0.6 (.11 | 3.195, 3.175 |  |
| 00.8 (0.15 | 3.186,3.169 |  |
| 1(0.159 | 3.171,3.166 | 3.197 |
| 1.2 | 3.163,3.152 |  |
| 1.4 | 3.152,3.141 |  |
| 1.5 |  | 3.172 |
| 1.6 | 3.145, 3.130 |  |
| 2 | ­­­\_\_,3.107 | 3.147 |
| 2.5 |  | 3.122 |
| 3 |  | 3.092 |
| 3.5 |  | 3.074 |
| 4 |  | 3.050 |
| 4.5 |  | 3.026 |
|  |  | 3.002 |

5V supplied from arduino 30A

|  |  |  |
| --- | --- | --- |
| Current | voltage | Voltage oct 14 |
| 0A | 4.86, 4.84 | 4.87 |
| 0.2 | 4.83, 4.82 |  |
| .4 | 4.81,4.80 | 4.84 |
| .6 | 4.75, 4.78 |  |
| .8 | 4.76, 4.77 |  |
| 1 | 4.76, 4.75 | 4.79 |
| 1.5 | 4.72,4.71 | 4.75 |
| 2 | 4.68,4 67 | 4.71 |
| 2.5 | \_\_\_,4.63 | 4.67 |
| 3 |  | 4.63 |
| 3.5 |  | 4.59 |
| 4 |  | 4.55 |
| 4.5 |  | 4.51/4.52 fluctuating |
| 5 |  | 4.47 |
| 6 |  |  |
| 7 |  |  |

From current sensor directly: 30A

|  |  |  |
| --- | --- | --- |
| Current | Vout (5V source) |  |
| 0 | 2.5 |  |
| 0.5 | 2.533 |  |
| 1 | 2.567 |  |
| 1.5 | 2.598 |  |
| 2 | 2.629 |  |
| 2.5 | 2.661 |  |
| 3 | 2.693 |  |
| 3.5 | 2.726 |  |
| 4 | 2.765 |  |
| 4.5 | 2.798 |  |
| 5 | 2.829 |  |
|  |  |  |
|  |  |  |
|  |  |  |

F = (kq1q2)/r2

1N\*r2 =(kq1q2) =F(0.5r)2

F = 1/4N

After putting on new resistors for 5V supply

|  |  |  |
| --- | --- | --- |
| Current | voltage | Current Vout |
| 0 | 1.150 | 2.5 |
| .5 | 1.155 | 2.548 |
| 1 | 1.160 | 2.607 |
| 1.5 | 1.165 | 1.648 |
| 2 | 1.170 | 2.697 |
| 2.5 |  | 2.745 |
| 3 |  | 2.795 |
| 3.5 |  | 2.8434 |
| 4 | 1.189 | 2.894 |
| 4.5 |  | 2.954 |
| 5 | 1.198 | 2.993 |
|  |  |  |
|  |  |  |
|  |  |  |

October 28 3v3 20A board with new resistor values (potentially fried op amp)

|  |  |
| --- | --- |
| Current | Vout (3V3 source) |
| 0 | 1.638 |
|  | 1.659 |
| 1 | 1.681 |
|  | 1.701 |
| 2 | 1.722 |
|  | 1.743 |
| 3 | 1.764 |
|  | 1.785 |
| 4 | 1.807 |
|  | 1.828 |
| 5 | 1.850 |

-current to voltage out from sensor is linear and results are as expected 0.100V/A.

- voltage out from the op-amp was linear. But not as expected because the op amp was not inverting for some reason. Resistor values are correct.

30A Sensor board (potential fried op amp) Oct 28th

|  |  |
| --- | --- |
| Current | Vout (op amp) |
| 0 | 4.87 |
| .5 | 4.83 |
| 1 | 4.79 |
| 1.5 | 4.75 |
| 2 | 4.71 |
| 2.5 | 4.68 |
| 3 | 4.64 |
| 3.5 | 4.60 |
| 4 | 4.56 |
| 4.5 | 4.52 |
| 5 | 4.48 |
|  |  |
|  |  |
|  |  |