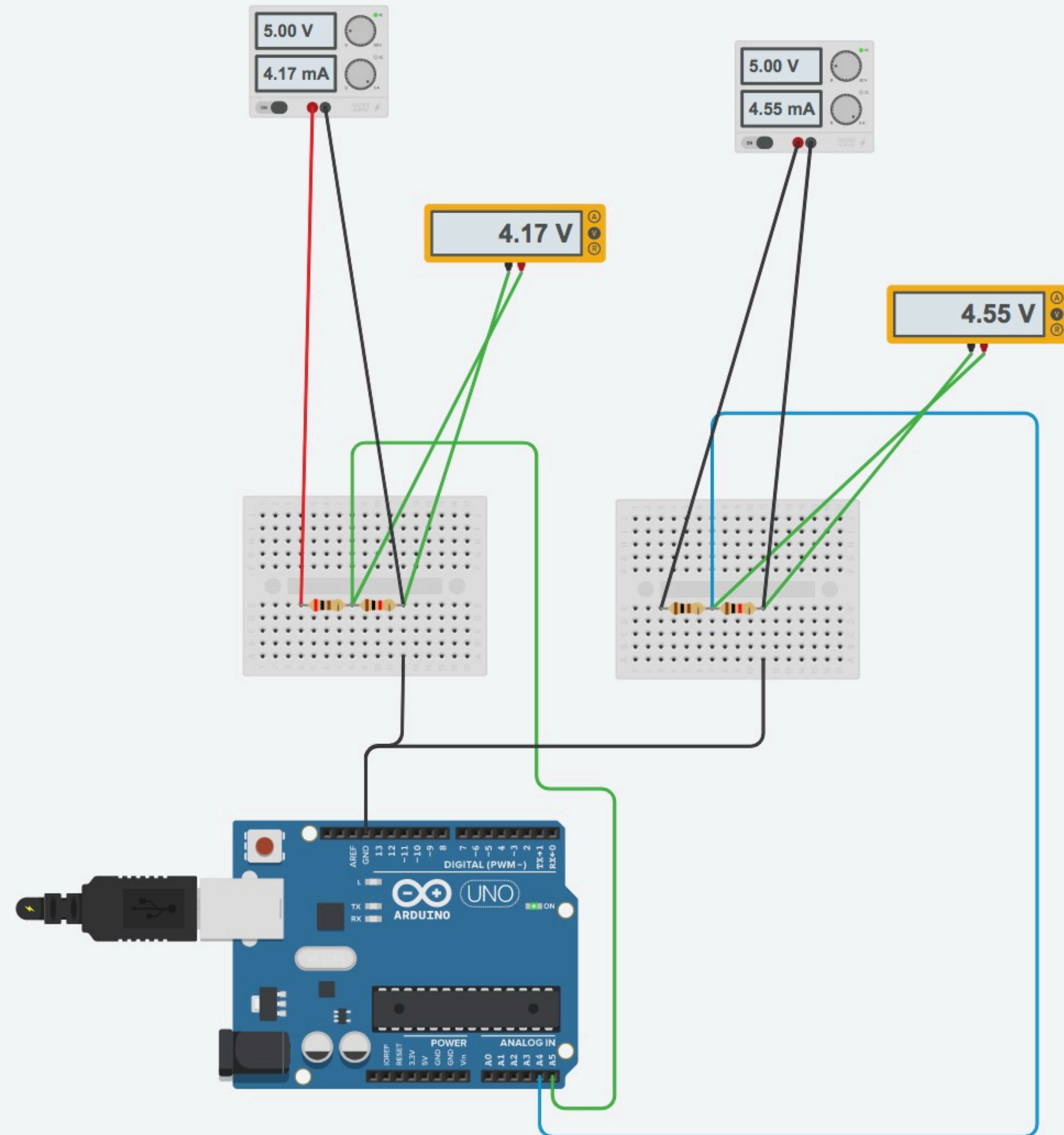


# Detector de Sal e Açúcar

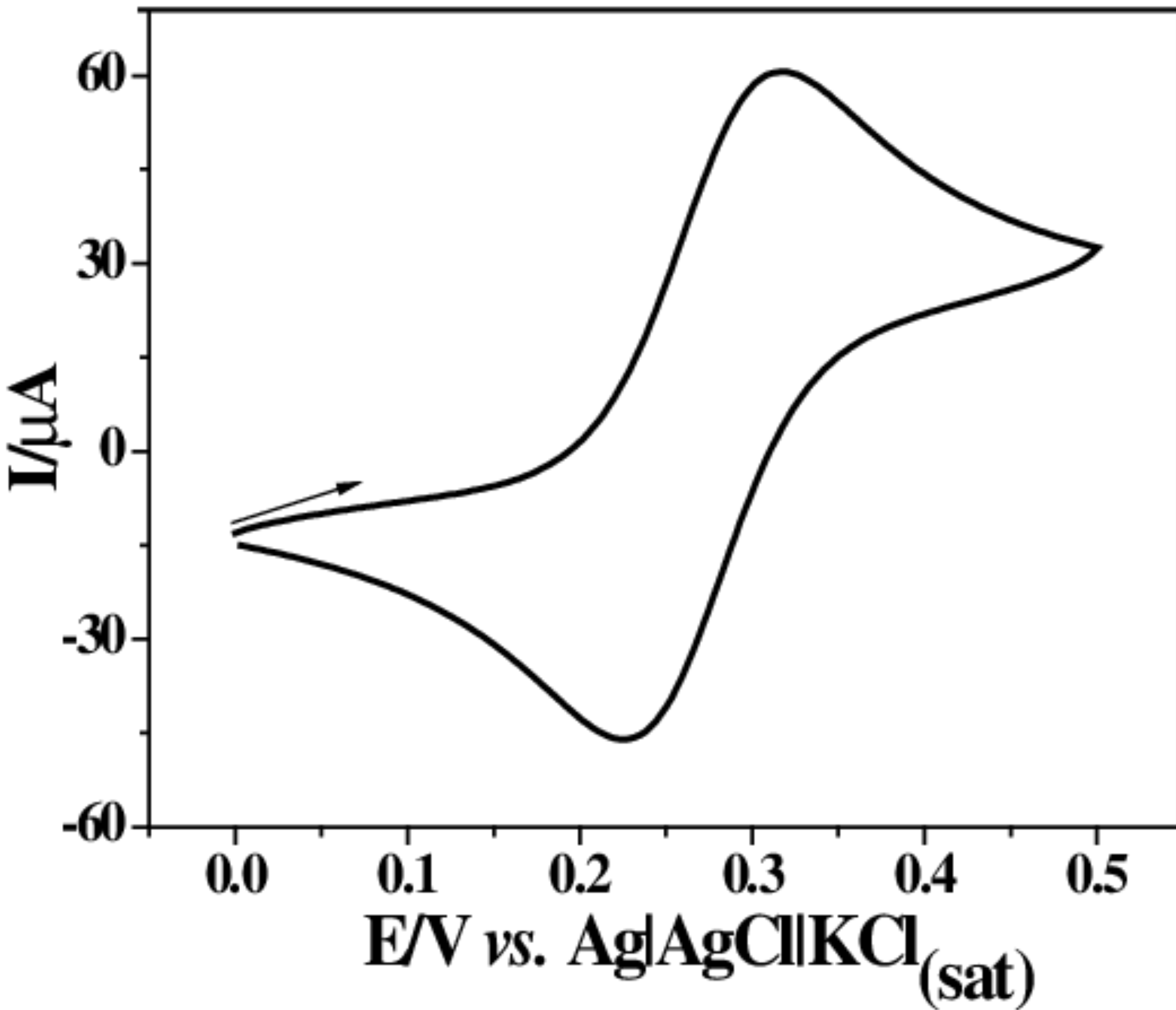
Utilizando Voltametria Cíclica

# 1º Protótipo

- Necessidade de Haver uma simulação do circuito;
- Tinkercad;
- Princípio de que:  $\text{Água} + \text{Açúcar} < \text{Água} < \text{Água} + \text{Sal}$ ;
- Divisor de Tensão.



# Voltametria Cíclica

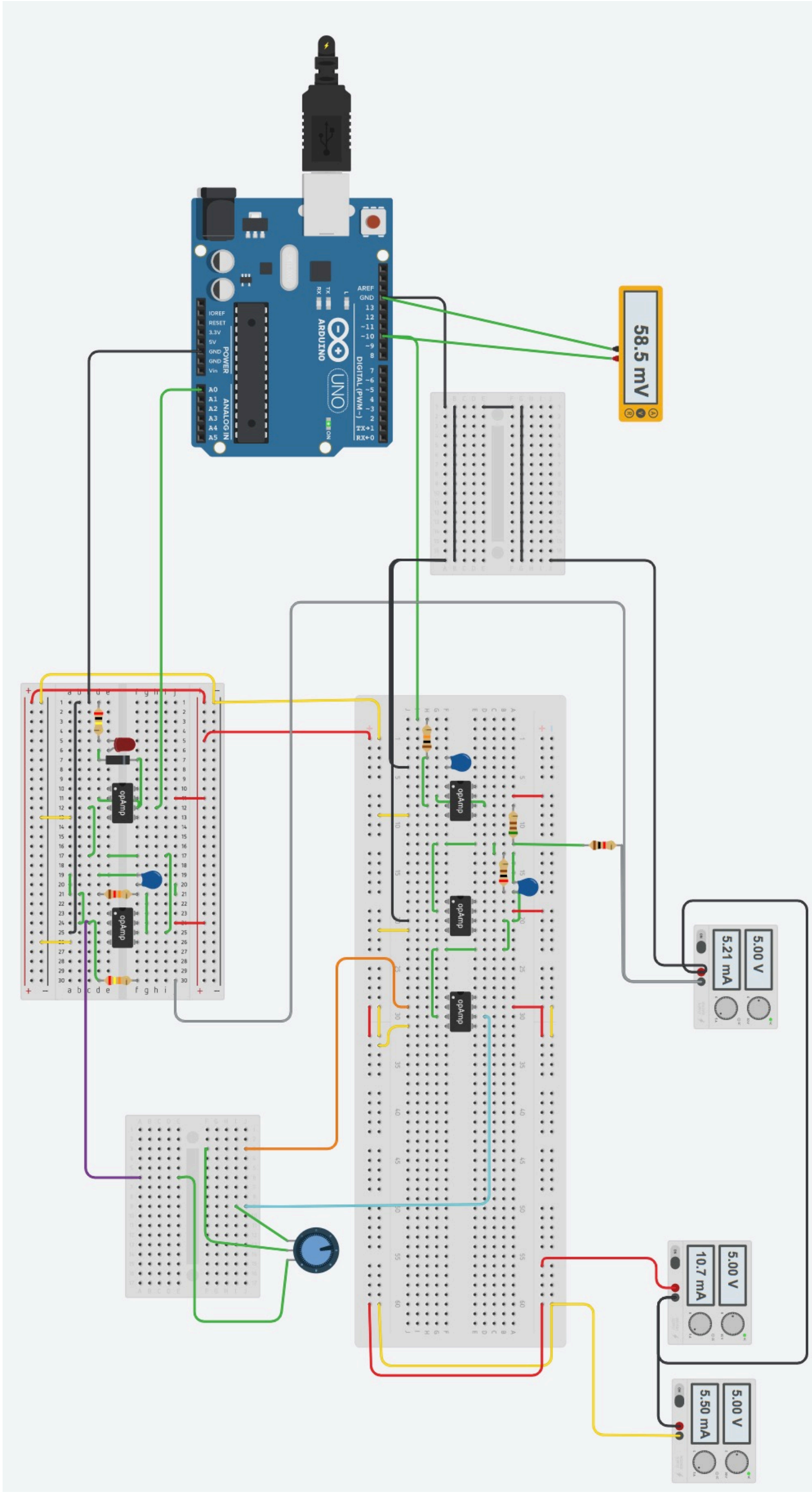


-Correlação entre o aumento de tensão com o aumento de corrente;

-Figura de Histerese.

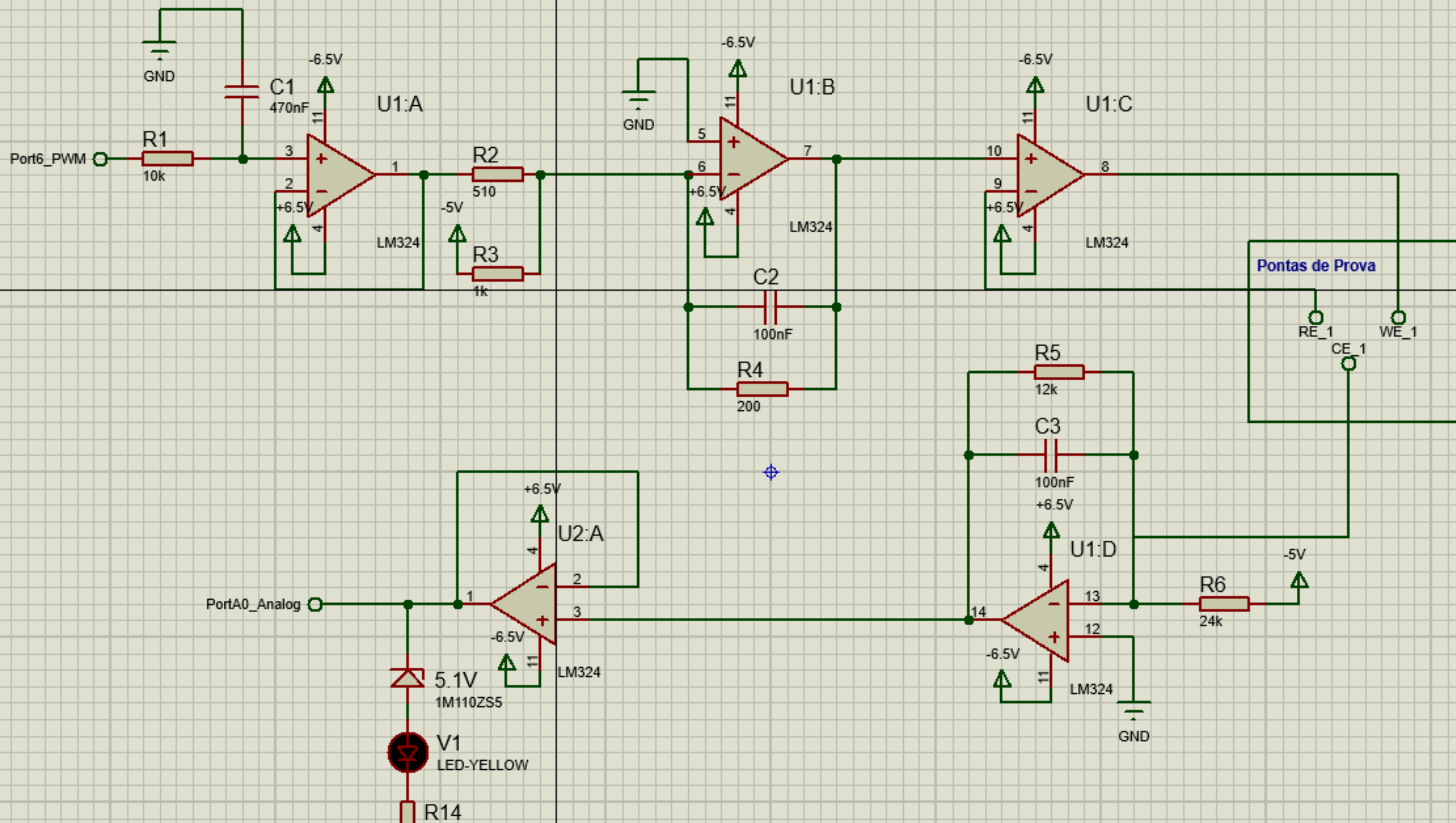
# Voltametria Cíclica no Arduino

- Simulação no TinkerCad;
- Simulação da mistura como um potenciômetro;
- Impossibilidade da simulação completa dos Amplificador operacional.





# POTENTIOSTAT 1



# Principais partes do Código

```
void loop() {  
  
    //Teste se um é maior q o outro:  
    analogWrite(a,240);  
    c = ((0.00195*(analogRead(ct))-1)*1000);  
    analogWrite(a2,240);  
    c2 = ((0.00195*(analogRead(ct2))-1)*1000);  
  
    if(c > c2){  
        //sal  
        Serial.println("Sal");  
    }  
    if(c == c2){  
        //agua  
        Serial.println("Agua");  
    }  
    if(c < c2){  
        //acucar  
        Serial.println("Acucar");  
    }  
}
```

////////////////////////////////////



# Principais partes do Código

```
//Scanner aumentando a tensao
for(val = 0; val <= 255; val++){
    analogWrite(a,val); //val vai ser o valor de tensao q vai sair na porta a
    Serial.print(val*Potstep);
    delay(intervalos[pos]);
    c = ((0.00195*(analogRead(ct))-1)*1000); // Leitura de corrente em uA!!!
    Serial.print(c);

    // se o arquivo abrir, escreva:
    if (myFile) {
        Serial.println("Writing to file...");
        // Escrevendo:
        myFile.println(val*Potstep +";");
        myFile.print(c +";");
    }
    // Se o arquivo n abrir, imprimir mensagem de erro:
    else {
        Serial.println("error ao abrir Resultados.CSV");
    }
}

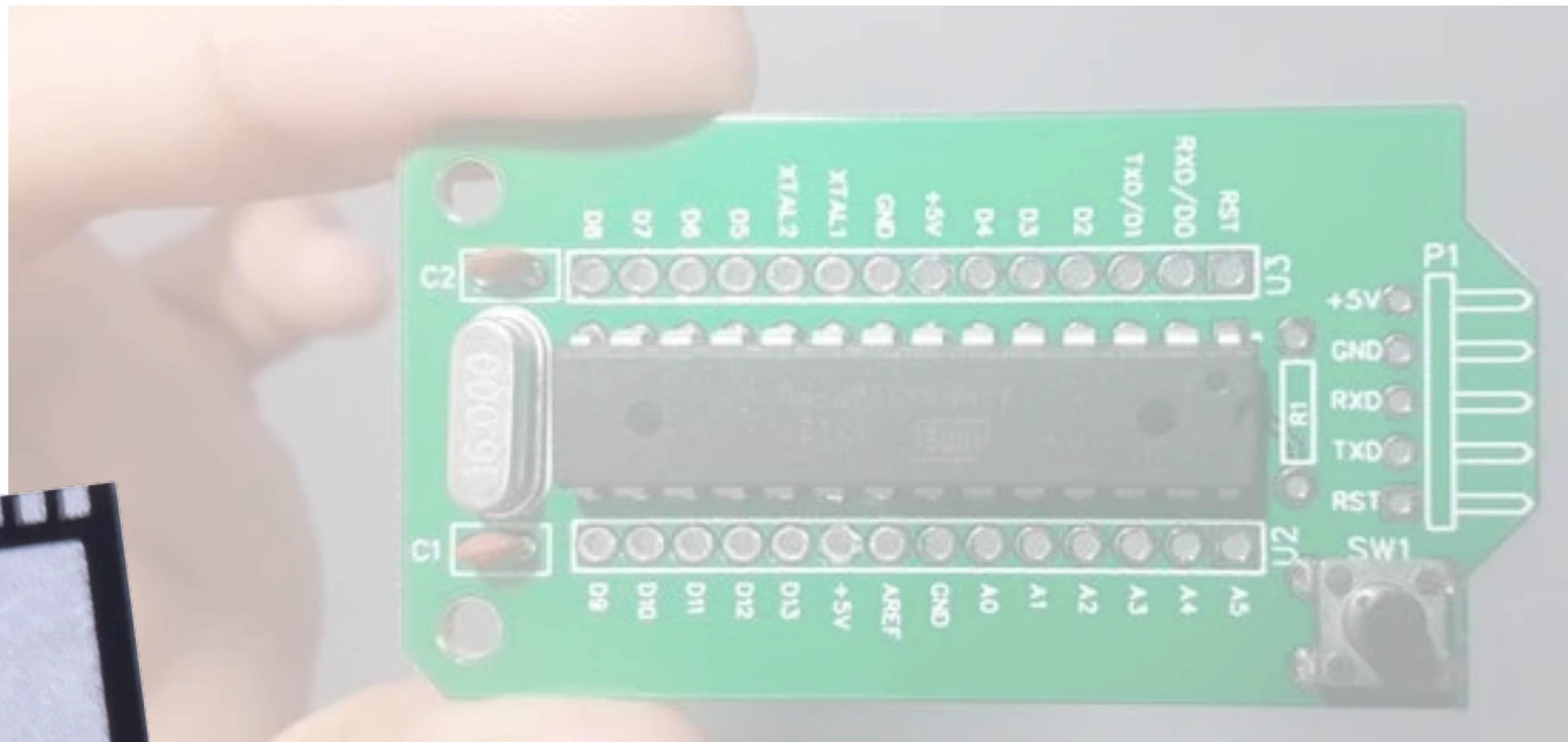
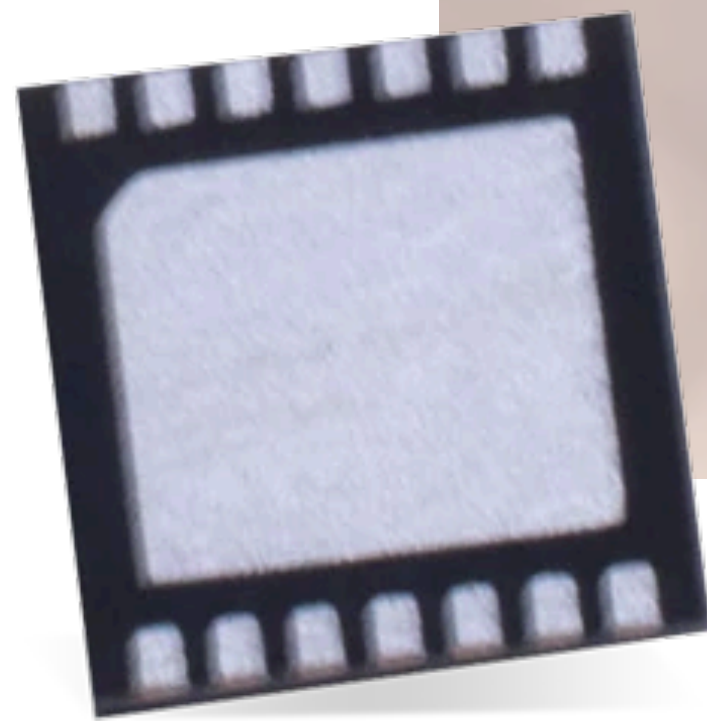
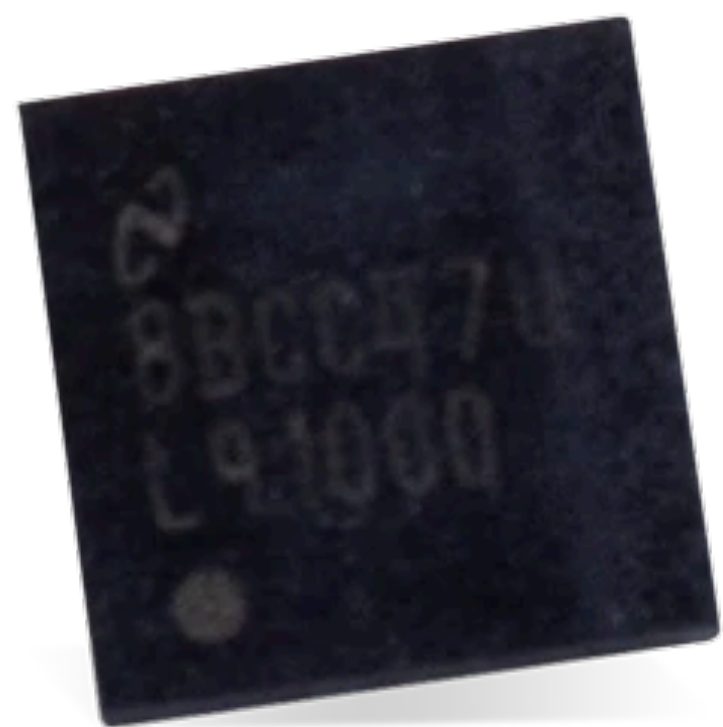
//Scanner diminuindo a tensao
for(val = 255; val >= 0; val--){
    analogWrite(a,val);
    Serial.print(val*Potstep);
    delay(intervalos[pos]);
    c = ((0.00195*(analogRead(ct))-1)*1000); // Leitura de corrente em uA!!!
    Serial.print(c);

    // se o arquivo abrir, escreva:
    if (myFile) {
        Serial.println("Writing to file...");
        // Escrevendo:
        myFile.println(val*Potstep +";");
```

# Materiais Utilizados

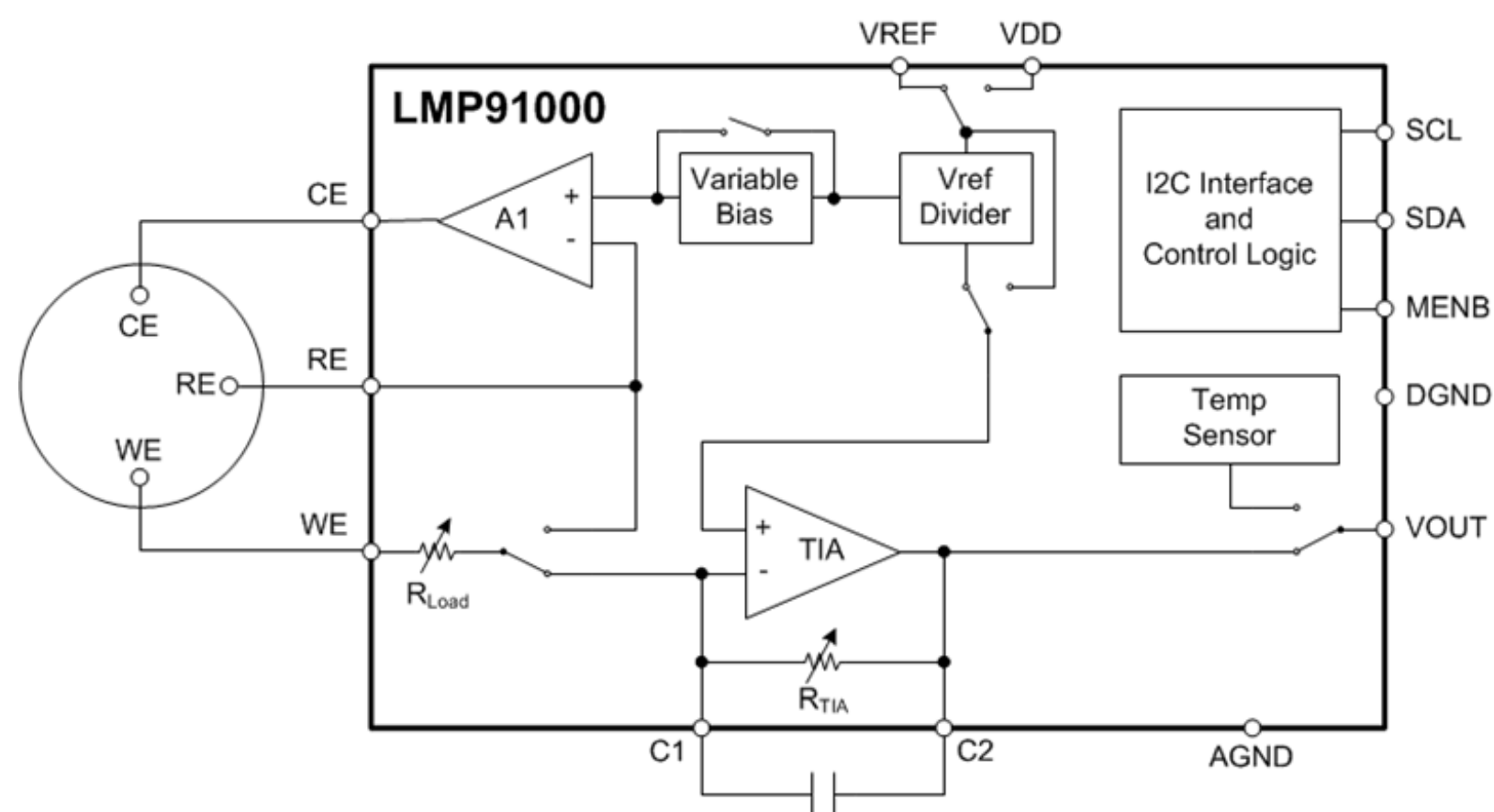
Componente	Quantidade Necessária
Arduino Uno	1
Resistor 10k ohm	2
Resistor 510 ohm	2
Resistor 1k ohm	2
Resistor 200 ohm	2
Resistor 12kohm	2
Resistor 24k ohm	2
Resistor 200k ohm	2
Conector	5
Capacitor 470nF	2
Capacitor 100nF	4
Led	2
Modulo Sd	1
LM324	3
Diodo Zener	2
Pontas de Prova	6
Placa de Circuitos	1





# Projetos Futuros

- Arduino standalone;
- Utilizar o LMP91000 (Existencia de Biblioteca).



# Fontes

- [https://www.researchgate.net/publication/329705803\\_Building\\_an\\_Arduino\\_based\\_potentiostat\\_and\\_Instrumentation\\_for\\_Cyclic\\_Voltammetry](https://www.researchgate.net/publication/329705803_Building_an_Arduino_based_potentiostat_and_Instrumentation_for_Cyclic_Voltammetry)
- <https://publiclab.org/wiki/potentiostat>
- <https://pubs.acs.org/doi/pdf/10.1021/acs.jchemed.5b00961>
- <https://www.arduino.cc/reference/en/libraries/lmp91000/>
- <https://www.ti.com/product/LMP91000#product-details##params>
- <https://github.com/LinnesLab/LMP91000/blob/master/examples/CyclicVoltammetry/CyclicVoltammetry.ino>
- <https://www.arduino.cc/reference/en/libraries/lmp91000/>
- [https://juami.org/wp-content/uploads/2018/12/JUAMI\\_potentiostat\\_supporting\\_information.pdf](https://juami.org/wp-content/uploads/2018/12/JUAMI_potentiostat_supporting_information.pdf)
- <https://pubs.acs.org/doi/10.1021/acs.jchemed.7b00361>
- <https://pubs.acs.org/doi/10.1021/acs.jchemed.5b00961>
- [https://pubs.acs.org/doi/suppl/10.1021/acs.jchemed.5b00961/suppl\\_file/ed5b00961\\_si\\_001.pdf](https://pubs.acs.org/doi/suppl/10.1021/acs.jchemed.5b00961/suppl_file/ed5b00961_si_001.pdf)
- [https://www.youtube.com/watch?t=91&v=B0lrcvT2HRc&feature=youtu.be&ab\\_channel=TeachEngineering](https://www.youtube.com/watch?t=91&v=B0lrcvT2HRc&feature=youtu.be&ab_channel=TeachEngineering)
- [https://www.youtube.com/watch?v=5Dp-XatLySM&ab\\_channel=HowToMechatronics](https://www.youtube.com/watch?v=5Dp-XatLySM&ab_channel=HowToMechatronics)





Obrigado

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