# Resistor Values Calculation for Optimal Variability for I2C count

```matlab
resResolution = 25;

A = logspace(2,5,resResolution);
B = logspace(2,5,resResolution);
C = logspace(2,5,resResolution);

boardMax = 16;

vTest = zeros(resResolution^3,boardMax);

for n = 1:boardMax
    for a = 1:resResolution
        for b = 1:resResolution
            for c = 1:resResolution

                rBranch = B(b) + C(c);
                for k = 2:n
                    rBranch = (rBranch*C(c))/(rBranch+C(c));
                    rBranch = rBranch + B(b);
                end

                index = (a-1)*resResolution^2 + (b-1)*resResolution + c;
                vTest(index,n) = rBranch / (rBranch + A(a));

            end
        end
    end
end

vLevel = 3.3;
vTest = vTest*vLevel;

slope = zeros(1,resResolution^3);

for k = 1:resResolution^3
    slope(1,k) = vTest(k,1) - vTest(k,end);
end

[maxSlope,index] = max(slope(:));

voltageSteps = vTest(index,:)
plot(linspace(1,boardMax,boardMax),vTest(index,:),'-o')
axis([1 boardMax 0 vLevel])

ResA = A(mod(floor(index/(resResolution^2)),resResolution) + 1)
ResB = B(mod(floor(index/resResolution),resResolution) + 1)
ResC = C(mod(index,resResolution) + 1)
```

```
voltageSteps =

  Columns 1 through 7

    2.6680    2.2402    1.9320    1.6997    1.5188    1.3741    1.2559

  Columns 8 through 14

    1.1579    1.0753    1.0049    0.9443    0.8918    0.8458    0.8053

  Columns 15 through 16

    0.7694    0.7376


ResA =

   2.3714e+04


ResB =

  133.3521


ResC =

   100
```
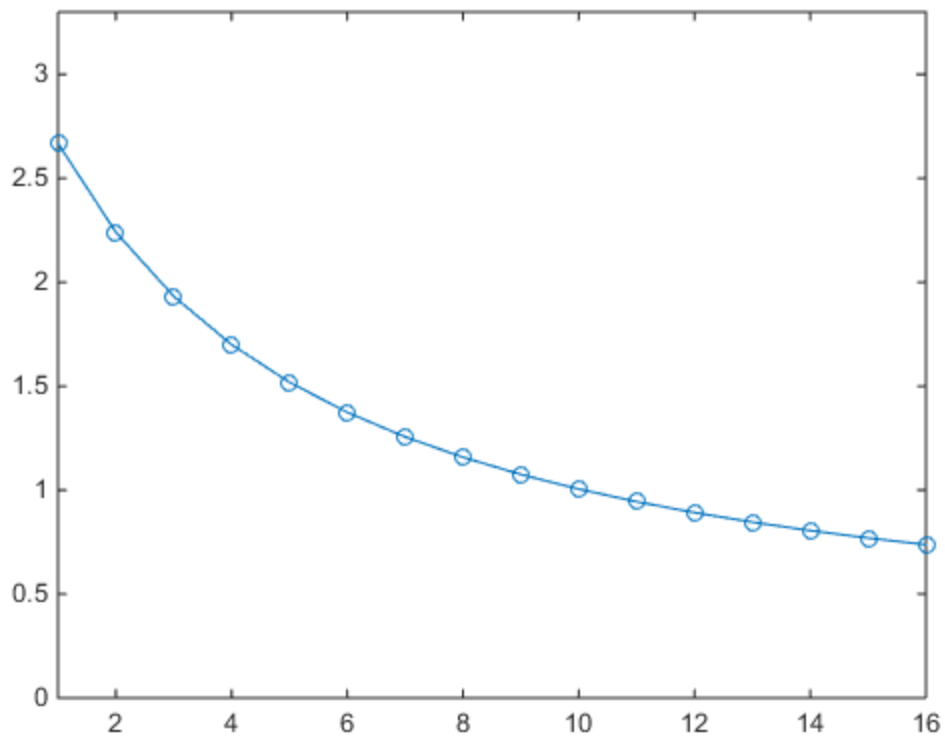
# Resistor Values Calculation for Optimal Variability for I2C assignment

```
resResolution = 25;

A = logspace(2,5,resResolution);
B = logspace(2,5,resResolution);
C = logspace(2,5,resResolution);

boardMax = 8;

vTest = zeros(resResolution^3,boardMax);
nodeTest = zeros(resResolution^3,boardMax);

for a = 1:resResolution
    for b = 1:resResolution
        for c = 1:resResolution

            rBranch = B(b) + C(c);
            for k = 2:boardMax
                rBranch = (rBranch*C(c))/(rBranch+C(c));
                rBranch = rBranch + B(b);
            end
```

```matlab
                index = (a-1)*resResolution^2 + (b-1)*resResolution + c;
                nodeTest(index,1) = (rBranch - B(b))/(A(a) + rBranch);

                for k = 2:boardMax

                    rBranch = B(b) + C(c);
                    for i = k:boardMax-1
                        rBranch = (rBranch*C(c))/(rBranch+C(c));
                        rBranch = rBranch + B(b);
                    end
                    rBranch = (rBranch*C(c))/(rBranch+C(c));

                    nodeTest(index,k) = nodeTest(index,k-1) * (rBranch/(rBranch + B(b)
                end

            end
        end
end

vLevel = 3.3;
nodeTest = nodeTest*vLevel;

slope = zeros(1,resResolution^3);

for k = 1:resResolution^3
    slope(1,k) = nodeTest(k,1) - nodeTest(k,end);
end

[maxSlope,index] = max(slope(:));
figure
voltageSteps = nodeTest(index,:)
plot(linspace(1,boardMax,boardMax),nodeTest(index,:),'-*')
axis([1 boardMax 0 vLevel])

ResA = A(mod(floor(index/(resResolution^2)),resResolution) + 1)
ResB = B(mod(floor(index/resResolution),resResolution) + 1)
ResC = C(mod(index,resResolution) + 1)


voltageSteps =

  Columns 1 through 7

    2.2949    1.5996    1.1175    0.7845    0.5561    0.4019    0.3013

  Column 8

    0.2408


ResA =

    100
```
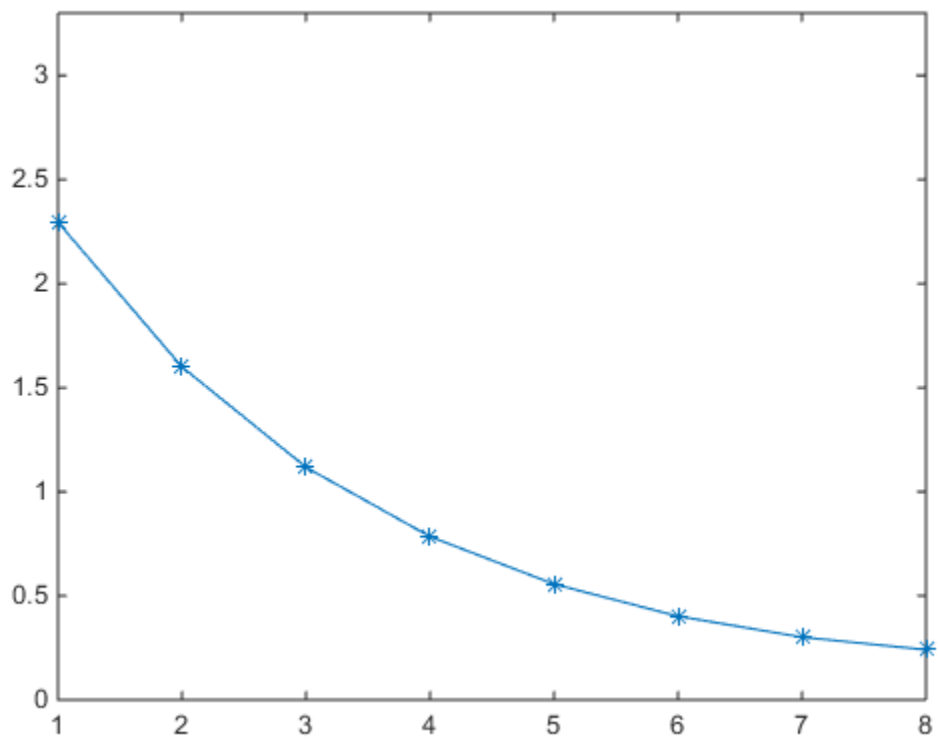
```
ResB =

   1.7783e+04


ResC =

   100
```



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