1 Data Processing

- Wire resistivity:

$$\rho = \frac{RS}{l}$$

- Wire section area

$$S = \frac{\pi d^2}{4}$$

1.1 Wire section area

$$S = \frac{\pi d^2}{4} = 3.14 * 0.40^2/4 = 0.126 \pm 0.006 mm^2$$
$$\sigma(S) = 5.00\%$$

1.2 Turn length

$$l_{step} = \frac{L}{N} = 123.0/50.0 = 2.460 \pm 0.010 (mm)/(unit)$$
$$\sigma(step) = 0.41\%$$
$$l_{circle} = \pi(D - 2h) = 3.14 * (160.000 - 20.200) = 501.398 \pm 3.134 mm$$
$$\sigma(circle) = 0.62\%$$
$$l_{turn} = \sqrt{(l_(circle))^2 + (l_(step))^2} = \sqrt{(501.398^2 + 2.460^2)} = 501.404 \pm 3.134 mm$$
$$\sigma(turn) = 0.62\%$$

1.3 LSM

$$R_n = \frac{\rho l}{S} n = kx + b$$
$$b=0$$
$$k = \frac{< R_n > - < n >< R_n >}{< n^2 > - < n >^2} = 4.218 \pm 0.013 Om * unit^-1$$

1.4 Resistivity

$$\rho = \frac{S * a}{l} = 0.126 * 4.218/501.404 = 0.001 \pm 0.0000529 Om * unit^-1 * m$$
$$\sigma(\rho) = 5.00\%$$