

$$A1., \quad \hat{d} = \frac{1}{N} \sum d_i = 4,998 \text{ cm} \quad s = \sqrt{\frac{1}{N-1} \sum (d_i - \hat{d})^2} = 0,1508 \text{ cm} \quad (1)$$

$$\Delta d = \frac{s}{\sqrt{N}} \underbrace{t_{N-1; \frac{\alpha}{2}}}_{t_{5; 0,05} = 2,014} = 0,1240 \text{ cm}$$

$$P[\hat{d} - \Delta d < d < \hat{d} + \Delta d] = 90\%$$

$$P[4,8744 \text{ cm} < d < 5,1223 \text{ cm}] = 90\% \quad (2)$$

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$$\hat{V} = \frac{\hat{d}^2}{4} \cdot m \cdot \pi = 196,35 \text{ cm}^3 \quad C_d = \frac{\partial V}{\partial d} = \frac{d}{2} m \pi \quad \sigma_V = \sigma_d \cdot C_d = 11,843 \text{ cm} \quad \Delta V = \frac{\sigma_V}{\sqrt{N}} \cdot t = 9,7378 \text{ cm}^3$$

(elfogadható zrel is $\Delta V' = 7,93 \text{ cm}^3$)

$$P[\hat{V} - \Delta V < V < \hat{V} + \Delta V] = 90\%$$

$$P[186,61 \text{ cm}^3 < V < 206,09 \text{ cm}^3] = 90\% \quad (2) \quad ([188,42 \text{ cm}^3, 204,28 \text{ cm}^3])$$

$$A11., \quad \frac{R_3}{Z_x} = R_3 Y_x = \frac{Z_4}{R_2}$$

$$R_3 \left(\frac{1}{R_x} + \frac{1}{j\omega L_x} \right) = (R_4 + \frac{1}{j\omega C_4}) \frac{1}{R_2} \quad (1)$$

$$R_x = \frac{R_2 R_3}{R_4} = 600 \Omega, \quad G_x = \frac{1}{R_x} = 1,667 \text{ mS}$$

$$L_x = R_2 R_3 C_4 = 108,0 \text{ mH} \quad (1)$$

$$R_5 + j\omega L_5 = \frac{1}{Y_x} = \frac{1}{\frac{1}{R_x} + \frac{1}{j\omega L_x}} = \left(\frac{1}{R_x} - \frac{1}{j\omega L_x} \right) \frac{\omega^2 L_x^2 R_x^2}{\omega^2 L_x^2 + R_x^2}$$

$$R_5 = \frac{\omega^2 L_x^2 R_x}{\omega^2 L_x^2 + R_x^2} = 68,83 \Omega \quad (2)$$

$$L_5 = \frac{R_x^2 L_x}{\omega^2 L_x^2 + R_x^2} = 95,61 \text{ mH}$$

$$Q = \frac{R_x}{\omega L_x} = 2,778 \quad (1)$$

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