A I.)

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

$\Delta d = \frac{s}{\sqrt{N}}\, t_{N-1;\frac{b}{2}} = 0{,}1240\ cm$

$t_{5;0{,}05} = 2{,}014$

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

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

(5)

$\hat{V} = \frac{\hat{d}^2}{4}\cdot m\cdot\pi = 196{,}35\ cm^3$ $\quad C_d = \frac{\partial V}{\partial d} = \frac{d}{2} m\pi$ $\quad \sigma_V = \sigma_d \cdot C_d = 11{,}843\ cm$ $\quad \Delta V = \frac{\sigma_V}{\sqrt{N}}\cdot t = 9{,}7375\ cm^3$

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

$P[\hat{V} - \Delta V < V < \hat{V} + \Delta V] = 90\%$ (2)

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

A II.)

$\frac{R_3}{Z_x} = R_3 Y_x = \frac{Z_4}{R_2}$

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

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

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

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

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

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

(5)

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