Oszacuj błąd względny i bezwzględny wyniku (2.1)

$$f = P = \frac{R^2 I^2}{C+R} \; [W]$$

$C = 1.1\ [mF] \pm 5\%$ $\quad \Delta C = 1.1 \cdot \frac{5}{100} = 0,05$

$R = 1 \pm 2\%$ $\quad \Delta R = 1 \cdot \frac{1}{100} = 0.01$

$I = 1,2 \pm 1\%$ $\quad \Delta I = 1.2 \cdot \frac{1}{100} = 0.012$

$\delta X = 5\% = \frac{\Delta X}{|X|} \Rightarrow 5\% \cdot X = \Delta X$

$(fg)' = f'g + g'f \quad \left(\frac{f}{g}\right)' = \frac{f'g - g'f}{g^2} \quad (cf)' = cf' \quad a' = 0 \quad x' = 1 \quad (ax+b)' = a$

$$f_C' = \left| \begin{matrix} f = R^2 I^2 & f_C' = 0 \\ g = C+R & g' = 1 \end{matrix} \right| = \frac{f_C' g - 1 \cdot f}{g^2} = \frac{-R^2 I^2}{(C+R)^2} \qquad f_C' = -\frac{R^2 I^2}{(C+R)^2}$$

$$f_I' = (I^2)' \frac{R^2}{C+R} = (I^2)' C = 2I \cdot \frac{R^2}{C+R} \qquad f_I' = \frac{2R^2 I}{C+R}$$

$$f_R' = \left| \begin{matrix} f = R^2 I^2 & f_R' = 2RI^2 \\ g = C+R & g_R' = 1 \end{matrix} \right| \quad f_R' = \frac{2RI^2 \cdot (R+C) - 1 \cdot (R^2 I^2)}{(C+R)^2} =$$

$$= \frac{2R^2 I^2 + 2RI^2 C - R^2 I^2}{(C+R)^2} = \frac{R^2 I^2 (2-1) + RI^2 (2C)}{(C+R^2)} = \frac{R^2 I^2 (R) + R}{}$$

$$= \frac{RI^2 (R+2C)}{(C+R)^2} = f_R' = \frac{RI^2 (R+2C)}{(C+R)^2}$$

$\Delta f(xyz) = |f_x'| \cdot \Delta x + |f_y'| \cdot \Delta y + |f_z'| \Delta z \quad \delta F = \frac{\Delta f}{|F|} \quad \Delta f = 0,04206$

$|f_C'| \Delta C = \frac{1^2 \cdot 1.44}{2.1^2} = \frac{1.44}{4.41} \cdot 0.015 = 0,01795$ $\quad \delta f = \frac{\Delta f}{|F(x)|} = \frac{0.04206}{1.44} = \frac{0.04206}{2.1^2} = 0.0$

$|f_I'| \Delta I = \frac{2.1 \cdot 1.2}{2.1} \cdot 0.012 = 0.01371$ $\quad \delta f = \frac{0.04206}{0.6857} = 0.0614 = \frac{1.44}{4.41} \cdot 0.0426$

$|f_R'| \cdot \Delta R = \frac{1 \cdot 1.44 \cdot (1+2.2)}{} \cdot 0.01 = \frac{4.608}{4.41} \cdot 0.01 = 0.0104$