

Лабораторная работа №1. Варианты заданий.

Часть 1.

$$1) \quad a = 0.75 \sqrt{0.5} - \frac{1}{2} \sqrt[3]{4},$$

$$b = 100^{\frac{1}{2} \ln 9 - \lg 2} \operatorname{tg} \left( \frac{1}{3} \right),$$

$$k = \begin{cases} \sqrt{15a^2 + 21b^2} & \text{при } a > b, \\ \sqrt{15b^2 + 21a^2} & \text{при } a \leq b. \end{cases}$$

$$2) \quad l_x = 4^{-0.25} - (2\sqrt{2})^{-4/3} \operatorname{tg} 4,$$

$$l_y = \cos \left( 2 \operatorname{arctg} \frac{1}{5} + \operatorname{arctg} \frac{1}{4} \right),$$

$$l_z = \begin{cases} \ln(|2l_x - 3e^2 l_y|) & \text{при } |l_x| < 5|l_y|, \\ \ln(|2l_x e^2 - 3l_y|) & \text{при } |l_x| \geq 5|l_y|. \end{cases}$$

$$8) \quad k = 86.9^{-1/4} + \left( \frac{1}{2^{-0.3}} \right)^{-1/3},$$

$$m = 49^{1 - \lg 2} + 5^{-\lg 4},$$

$$p = \begin{cases} \sin(5k + 3m \ln 3) & \text{при } |k| > |m|, \\ \cos(5k + 3m \ln 3) & \text{при } |k| \leq |m|. \end{cases}$$

$$4) \quad k_1 = \frac{8.15 \sqrt[3]{14.36} \ln 2}{24.38 \sqrt{8.734} (e^2 - e^{-2})},$$

$$k_2 = \sin \left( \arcsin \frac{1}{2} + \arccos \frac{1}{3} \right),$$

$$r = \begin{cases} \sqrt{|2k_1 - 7k_2|} & \text{при } \min(k_1, k_2) < 1, \\ \sqrt{2k_1 + 7k_2} & \text{при } \min(k_1, k_2) \geq 1. \end{cases}$$

$$5) \quad r = 22.5^{-1/2} - 7.5 \left( \frac{-\frac{3}{4}}{\sqrt{2.87}} \right)^2 \cos 1,$$

$$m = -\lg \left( 1.6 \sqrt[3]{1.2} e^3 \right),$$

$$s = \begin{cases} \frac{4r + 3m}{r^2 + m^2} & \text{при } |r| > |m| + 1/2, \\ |r - m| & \text{при } |r| \leq |m| + 1/2. \end{cases}$$

$$6) \quad \xi = \frac{\cos 5}{4 - \sqrt{11}} + \frac{\sin 1}{3 + \sqrt{7}},$$

$$\eta = 2 \left( \arcsin \frac{5}{13} + \arcsin \frac{12}{13} \right) \ln 3,$$

$$\zeta = \begin{cases} \sqrt{3\xi^2 + 4\eta^2} & \text{при } |\xi| \leq 2|\eta|, \\ \sqrt{3\xi^2 - 4\eta^2} & \text{при } |\xi| > 2|\eta|. \end{cases}$$

$$7) \quad s = \frac{12.48 \sqrt[3]{5.76} \sin 4}{(1.842)^4 \sqrt[3]{673.8} \cos 8},$$

$$t = \lg \left( \sqrt[3]{3} \sqrt[3]{3} \right) - \frac{1}{4},$$

$$n = \begin{cases} \frac{s - 2t}{2s^2 + 5t^2} & \text{при } st < 0, \\ \sqrt{st} & \text{при } st \geq 0. \end{cases}$$

$$8) \quad c = \left( 0.027^{-1/3} - \left( \frac{1}{6} \right)^{-2.2} \right) \ln 3,$$

$$k = 3 \sin 1 + \cos 1,$$

$$l = \begin{cases} \operatorname{th}(c - 2k) & \text{при } |c + k| > 2, \\ \ln(|c - 2k|) & \text{при } |c + k| \leq 2. \end{cases}$$

$$9) \quad u_i = \sqrt[5]{\frac{25 + \sqrt{136}}{0.00034}},$$

$$v_i = \operatorname{arctg} \left( \cos \frac{\pi}{5} + \cos \frac{2\pi}{5} \right) \cdot \ln 5,$$

$$m = \begin{cases} \frac{e^{-u_i} + e^{-v_i}}{2|u_i| + 3|v_i|} & \text{при } 2|u_i| < v_i, \\ u_i + v_i & \text{при } 2|u_i| \geq v_i. \end{cases}$$

$$10) \quad l_1 = \sqrt{\frac{2.591 \sqrt[3]{0.0836}}{1.147(e^2 + e^{-2})}},$$

$$l_2 = \sqrt[3]{-\lg 0.8} \operatorname{tg} 4$$

$$u = \begin{cases} \frac{3l_1 - 5l_2}{l_1^2 + l_2^2} & \text{при } |l_1| < 1 + |l_2|, \\ \frac{3l_1 + 5l_2}{l_1^2 - l_2^2} & \text{при } |l_1| \geq 1 + |l_2|. \end{cases}$$

$$11) \quad m_t = \sqrt[5]{7.002 \sqrt[3]{0.1} - 1 + \frac{1}{10}(e^2 + e^{-2})},$$

$$n_t = \ln 3 \cdot \left( \cos \frac{\pi}{5} + \cos \frac{3\pi}{5} \right),$$

$$s = \begin{cases} \operatorname{arctg}(5m_t^2 + 7n_t^2) & \text{при } m_t^2 + n_t^2 > 0.1, \\ \arcsin(5m_t^2 + 7n_t^2) & \text{при } m_t^2 + n_t^2 \leq 0.1. \end{cases}$$

$$12) \quad n_1 = \sqrt[10]{10 + \sqrt[10]{10}} \operatorname{tg} 1,$$

$$n_2 = \left( 1 + \sqrt[5]{\lg 20} \right)^{\frac{3}{0.2}},$$

$$n_3 = \begin{cases} \sin(\pi n_1 + e^{n_2}) & \text{при } n_1 + n_2 < 5, \\ \sin(\pi n_1 + n_2) & \text{при } n_1 + n_2 \geq 5. \end{cases}$$

$$13) \quad m = \sqrt[3]{4.2013 \sqrt{0.1} + 2 - \frac{1}{3}(e^2 + e^{-2})},$$

$$r = \sin \left( \frac{1}{2} \operatorname{arctg} \left( -\frac{3}{4} \right) (\ln 5) \right),$$

$$k = \begin{cases} \sqrt{|3m - 5r|} & \text{при } m < 2r, \\ \sqrt{|3m + 5r|} & \text{при } m \geq 2r. \end{cases}$$

$$14) \quad d = \frac{4 - 0.0186^2}{\sqrt{0.1} - \sqrt{10}} \operatorname{tg} 2,$$

$$c = \sin((1 + \sqrt[3]{\lg 3})^4),$$

$$l = \begin{cases} \sqrt{|d + c|} & \text{при } d^2 + c^2 > 10, \\ d + c & \text{при } d^2 + c^2 \leq 10. \end{cases}$$

$$15) \quad m_r = \frac{3.78(e^4 - e^3)}{\sqrt[3]{4} + \sqrt[5]{3}},$$

$$m_s = (\ln 3) \sin \left[ \frac{1}{2} \arcsin \left( -\frac{2\sqrt{2}}{3} \right) \right],$$

$$m_t = \begin{cases} \frac{m_r - 2m_s}{m_r^2 + 2m_s^2} & \text{при } |m_r - 2m_s| \leq 1, \\ \frac{2}{m_r - 2m_s} & \text{при } |m_r - 2m_s| > 1. \end{cases}$$

$$16) \quad n_1 = \frac{(\log_5 5) \sqrt{5} - \sqrt[3]{5} \log_3 5}{1 - 0.1845(\sin 1 + 2 \cos 1)},$$

$$n_2 = e^{-2} \operatorname{ctg} \left[ \frac{1}{2} \arccos \left( -\frac{4}{7} \right) \right],$$

$$s = \begin{cases} \sqrt{|n_1 n_2|} & \text{при } n_1 n_2 < -0.1, \\ \sqrt{|n_1 + n_2|} & \text{при } n_1 n_2 \geq -0.1. \end{cases}$$

Часть 2.

Вариант задания	Расчетные формулы
1	$a = \frac{2 \cos (x - \pi/6)}{1/2 + \sin^2 y}$ $b = 1 + \frac{z^2}{3 + z^2/5}$
2	$\gamma =  x^{y/x} - \sqrt[3]{y/x} $ $\psi = (y - x) \frac{y - z/(y - x)}{1 + (y - x)^2}$
3	$s = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!}$ $\psi = x (\sin x^3 + \cos^2 y)$
4	$y = e^{-bt} \sin (at + b) - \sqrt{ bt + a }$ $s = b \sin (at^2 \cos 2t) - 1$
5	$w = \sqrt{x^2 + b} - b^2 \sin^3 (x + a)/x$ $y = \cos^2 x^3 - x/\sqrt{a^2 + b^2}$
6	$s = x^3 \operatorname{tg}^2 (x + b)^2 + a/\sqrt{x + b}$ $Q = \frac{bx^2 - a}{e^{ax} - 1}$

Вариант задания	Расчетные формулы
7	$R = x^2 (x + 1) / b - \sin^2 (x + a)$ $s = \sqrt{xb/a} + \cos^2 (x + b)^3$
8	$y = \sin^3 (x^2 + a)^2 - \sqrt{x/b}$ $z = \frac{x^2}{a} + \cos (x + b)^3$
9	$f = \sqrt[3]{m \operatorname{tg} t +  c \sin t }$ $z = m \cos (bt \sin t) + c$
10	$y = b \operatorname{tg}^2 x - \frac{a}{\sin^2 (x/a)}$ $d = ae^{-\sqrt{a}} \cos (bx/a)$
11	$f = \ln (a + x^2) + \sin^2 (x/b)$ $z = e^{-cx} \frac{x + \sqrt{x + a}}{x - \sqrt{ x - b }}$
12	$y = \frac{a^{2x} + b^{-x} \cos (a + b) x}{x + 1}$ $R = \sqrt{x^2 + b} - b^2 \sin^3 (x + a) / x$
13	$z = \sqrt{ax \sin 2x + e^{-2x} (x + b)}$ $w = \cos^2 x^3 - x / \sqrt{a^2 + b^2}$
14	$U = \frac{a^2 x + e^{-x} \cos bx}{bx - e^{-x} \sin bx + 1}$ $f = e^{2x} \ln (a + x) - b^{3x} \ln (b - x)$
15	$z = \frac{\sin x}{\sqrt{1 + m^2 \sin^2 x}} - cm \ln mx$ $s = e^{-ax} \sqrt{x + 1} + e^{-bx} \sqrt{x + 1,5}$