

ЛАБОРАТОРНАЯ РАБОТА №13

Тема: Линейные вычисления в математическом пакете MathCAD

Полученные результаты в работе 4 проверить, используя математический пакет MathCAD.

Вариант 1

1. $z = \sqrt{0,45 + x^3 + (x^2 - 1)^2}; \quad x = 3,8$

2. $z = \frac{7,2 \cdot \ln|x-1| - e^{t-1}}{x^{2,4} - t^2}; \quad x = 0,58; \quad t = 0,3$

3. $z = \frac{\sin^3(\alpha^2 + \beta)}{\cos(2,8 \cdot \gamma + \alpha)}; \quad \alpha = \frac{\pi}{4}; \quad \beta = 0,4; \quad \gamma = \frac{\pi}{8}$

4. $z = u + v; \quad \text{где } u = \frac{\sqrt[3]{x^3 + 2}}{0,5 \cdot (x^2 + 1)} \sin 3x; \quad v = (1 - y)^2 / (1 - \cos^2 y); \quad x = 7,3; \quad y = 0,3$

5. $l = k^{m-1} + \ln(x^3 - y) + \frac{\sqrt[3]{x+y}}{\operatorname{ctg}(z+1)}; \quad k = 3; \quad m = 3; \quad x = 4,7; \quad y = 5,8; \quad z = 4,9$

Вариант 2

1. $z = 2,58(x^3 - 1) - \ln(x^2 + 3); \quad x = 5,1$

2. $z = \frac{e^{2x} - e^t}{\lg|x^3 - t|}; \quad x = 1,3; \quad t = 6,2$

3. $z = \frac{\cos(\alpha^2 + \beta) - \sin \alpha}{\operatorname{tg}(\pi + \alpha)}; \quad \alpha = 0,3; \quad \beta = 2,1$

4. $z = u + v; \quad \text{где } u = \sqrt{|x^3 - a^3|} + \sin a; \quad v = \ln|3 - x \cdot a|; \quad x = 0,2; \quad a = 2,72$

5. $l = m^{k+1} - \lg(k + x) - \frac{\sin kx}{\sqrt{x-1}}; \quad m = 3; \quad k = 2; \quad x = 1,56$

Вариант 3

1. $z = 0,082 \cdot x^3 + e^{x+1}; x = 1,53$
2. $z = \frac{[\lg(y^3 + 7,51) - y]}{|y - 8,08|}; y = 6,22$
3. $z = \frac{\operatorname{tg}(x^2 + y^2)}{\cos^2(x^2 + y) - \cos x}; x = \frac{\pi}{3}; y = 0,2$
4. $z = uA; \text{ где } u = \lg^2(x-1); A = 9,5(y^{0,3} - e^x); x = 5,85; y = 21,3$
5. $l = k^{n+2} - \operatorname{tg}(\cos(x+y)); k = 2; n = 1; x = 0,33; y = \pi/4$

Вариант 4

1. $z = x^{1/2} + (3,37 \cdot x + 2,03)^2; x = 2,8$
2. $z = \frac{\cos(w-1) + \ln(w^2 + 3)}{0,58 \cdot t}; w = 2,65; t = 2,7$
3. $z = \frac{\operatorname{tg}^2(\alpha - \beta) + \cos^2 \alpha}{\sin(\alpha + \beta)}; \alpha = \frac{\pi}{3}; \beta = 0,2$
4. $z = u \cdot t, \text{ где } u = \sqrt{|x^{1/3} - a^{1/2}|}; t = \ln(a^{1/2} + e^x); x = 5,73; a = 14,25$
5. $y = h^{v-f} + \sin^2(v+f) - \frac{\sqrt{v}}{\ln f}; h = 3; v = 2,5; f = 2$

Вариант 5

1. $z = \sqrt{3x} + (2,4 \cdot x + 12,3)^2; x = 4,8$
2. $z = \frac{\sin(x-1) + \lg(x^2 - 1)}{0,51t}; x = 3,25; t = 2,02$
3. $z = \frac{\operatorname{tg}(\alpha - \beta) + \cos^3 \alpha}{\sin^3(\alpha + \beta)}; \alpha = \frac{\pi}{3}; \beta = 0,5$
4. $z = u \cdot t, \text{ где } u = \sqrt{|x^{1/3} - a^{1/2}|}; t = \ln(a^{1/2} + x^{1/3}); x = 18,08; a = 11,75$
5. $l = k^{m-n} + \cos^2(m+n \cdot x) - \frac{\sqrt{m}}{\log_2 n}; k = 3; m = 5; n = 2; x = 2,3$

Вариант 6

1. $z = 2.198x^2 - (x^{\frac{1}{2}} + 1)^2$; $x = 3.75$
2. $z = \frac{\cos x^2 - \sin^2 y}{\cos y^2 - \sin x}$; $x = 0,51$; $y = 0,2$
3. $z = \frac{\cos|\alpha + \beta|}{\sin \gamma + \cos \alpha + \operatorname{tg} \beta}$; $\alpha = \frac{\pi}{6}$; $\beta = 0,2$; $\gamma = 0,4$
4. $z = u \cdot v$; где $u = \sqrt{|x^3 - a^3|} + a$; $v = 6,5 \cdot \ln|x - a|$; $x = 0,2$; $a = 2,72$
5. $l = m^{k-1} - \operatorname{ctg}(m - k) - \frac{1}{\sqrt{x-1}}$; $m = 3$; $k = 2$; $x = 1,41$

Вариант 7

1. $z = 0,65(x^2 - 2) + x^{\frac{1}{3}}$; $x = 13,58$
2. $z = (e^{x-1,2} + e^{1,2+x}) / \ln(0,1t)$; $t = 53,5$; $x = 2,5$
3. $z = \left[\cos^2 \alpha + \frac{\sin \alpha}{\cos(\alpha - \beta)} \right] \cdot \sin^2(\alpha - \beta)$; $\alpha = \frac{\pi}{3}$; $\beta = \frac{\pi}{8}$
4. $z = u \cdot y$, где $u = \ln|c^2 - 7,25|$; $c = 2,1$; $y = \sqrt{a-b} \cdot \cos \frac{a}{b}$; $a = 1,1$; $b = 0,5$
5. $l = \frac{m^2 + k^m \cdot \operatorname{tg}|z|}{\sin(z-1)}$; $m = 3$; $k = 2$; $z = 0,3$

Вариант 8

1. $z = (8,59 - x^{1/3}) - (1 - \ln x)$; $x = 0,53$
2. $z = [\lg(x^2 + 1) + e^{x-1}] / (x^2 - t)$; $x = 4,8$; $t = 3,27$
3. $z = [\operatorname{tg}(\alpha - \beta)^2 - 1] / \cos^2(\gamma - 1)$; $\alpha = \pi/6$; $\beta = 0,3$; $\gamma = 2,1$
4. $z = x \cdot y$; где $x = \sqrt[3]{2,8u^2 - a}$; $y = |\cos^2(t-1) / \sin(t+1)|$; $u = 1,4$; $a = 0,8$; $t = 3,8$
5. $l = n^k + \frac{\sqrt[4]{z^3}}{\ln x} + \sin \left| \frac{x}{2} \right|$; $n = 2$; $k = 3$; $z = 7,7$; $x = 0,8$

Вариант 9

1. $z = 2,58(x^3 - 1) - \ln(x+1); \quad x = 5,1$

2. $z = \frac{e^{2x} - e^{2t}}{\ln |x - t|}; \quad x = 1,3; \quad t = 6,2$

3. $z = \frac{\cos(\alpha^2 + \beta) - \sin^2 \beta}{\operatorname{tg}(\pi + \alpha + \beta)}; \quad \alpha = 0,3; \quad \beta = 2,1$

4. $z = u \cdot v, \text{ где } u = \sqrt{|x^3 - a^3|} + a; \quad v = 12,35 \cdot \ln|x - a|; \quad x = 0,82; \quad a = 2,72$

1. $l = m^{k-1} - \operatorname{tg}(m+k) - \frac{1}{\sqrt{x-1}}; \quad m=3; \quad k=2,5; \quad x=2,41$

Вариант 10

1. $z = (24,6 + x - a^2)^2 + \ln x^3; \quad x = 0,3; \quad a = 1,72$

2. $z = 1 - \left(\frac{1}{e^x} + e^{x+1} \right) / \sin^2 x; \quad x = 1,32$

3. $z = \left[\frac{\cos^2 \alpha}{\sin(\alpha - 1)} - 1,2^{0,2} \right] / [2,5 - \cos(\alpha + \beta)]; \quad \alpha = \frac{\pi}{3}; \quad \beta = 0,7$

4. $z = \frac{u}{v}; \quad \text{где } u = \sqrt{1 - y^2} \cdot \sin|x|; \quad v = \lg y \cdot |1 - \sin y|; \quad y = 0,5; \quad x = \frac{\pi}{8}$

5. $l = k^m + \frac{1}{1 - \sin m} \cdot \frac{\sqrt{n}}{k + x}; \quad k = 2; \quad m = 3; \quad n = 2; \quad x = 2,15$

Вариант 11

1. $z = (a - 2,3)^2 \cdot (x^2 - 1)^2$; $x = 2,58$; $a = 0,3$
2. $z = (e^x - 1) \cdot (1 - e^{x-1}) / (1 - x)$; $x = 1,55$
3. $z = \left| \ln x + \frac{\sin(\alpha + \beta)^2}{\cos \gamma^2} \right|$; $x = 0,25$; $\alpha = \pi/3$; $\beta = 0,5$; $\gamma = 0,1$
4. $z = u + v$; где $u = \frac{\sqrt[5]{x^3 + 1}}{0,3 \cdot (x^2 + 1)} \sin x$; $v = (1 - y)^2 / (1 - \cos y)$; $x = 7,3$; $y = 0,3$
5. $l = (m + n)^{k-1} - (x - \sin x)^{k-1}$; $m = 3,3$; $n = 1$; $k = 3$; $x = 2,5$

Вариант 12

1. $z = 2,5(x+1)^2 + a(x^2 - 1)^2$; $x = 2,58$; $a = 0,5$
2. $z = 7 - (10 - e^{x+1}) / (1 + x)$; $x = 0,35$
3. $z = \lg x + \frac{\sin(\alpha + \beta)^2}{\cos^2 \gamma}$; $x = 18,2$; $\alpha = \pi/3$; $\beta = 0,3$; $\gamma = 0,2$
4. $z = u - v$, где $u = \frac{\ln 3y}{\sqrt{y^2 + 1}}$; $v = \sqrt{\left| 1 - \frac{y^2}{3} \right|}$; $y = 5,7$
5. $l = k^m + \frac{\operatorname{tg} 3x}{(1 - m) \sin 2x}$; $k = 3$; $m = 2$; $x = 0,38$

Вариант 13

1. $z = \sqrt{a^3 + x^3} \cdot \lg(a^2 - x)$; $x = 2,3$; $a = 5,0$
2. $z = [7,8 - e^{x-1} - (x-1)] / \sin(e^{2-x})$; $x = 3,51$
3. $y = \frac{\cos^3(\alpha - \beta) - \sin \beta^2}{\cos 3\alpha - \operatorname{tg} 2\alpha}$; $\alpha = \frac{\pi}{6}$; $\beta = 6,2$
4. $z = u \cdot v$; где $u = \sqrt[3]{x^3 - y^2} \cdot \ln|x - y|$; $v = \lg\left(\frac{a}{b} - 1\right) + 1$; $x = 4,8$; $y = 5,5$; $a = 5,25$; $b = 2,7$
5. $l = (m + a + 1)^k - \frac{1}{\sqrt{m - a}} + \sin \frac{x}{y}$; $m = 4$; $a = 2,2$; $k = 3$; $x = 1,5$; $y = 5,1$

Вариант 14

1. $z = (a-2)^2(x^2-1)^2; x = 2,75; a = 5,3$

2. $z = \ln^3 x + \frac{e^{x-1}}{x-2}; x = 4,7$

3. $z = \left| \lg x + \frac{\sin(\alpha + \beta)^2}{\cos^2 y} \right|; x = 15,25; y = 0,25; \alpha = \frac{\pi}{3}; \beta = 0,5;$

4. $z = u + v, \text{ где } u = \frac{\sqrt[4]{x^3+1} \cdot \sin x}{0,2(x^2-1)}; v = \frac{1+y^2}{1-\cos y}; x = 3,5; y = 0,45$

5. $l = (m+n)^{k-0,5} - (x - \sin x)^{k-1}; m = 3; n = 2; k = 3; x = 1,55$