[illegible] 621.762

[illegible]
[illegible]

[illegible]

[illegible] M_{15}, [illegible]

[illegible]

[illegible] [1]. [illegible] [2].

[illegible] M_{15}, [illegible]

[illegible] Fe [illegible]:

- [illegible] M_1, %;
- [illegible] M_2, [illegible];
- [illegible] M_3, ^{0}C;
- [illegible] M_4, %.

[illegible] 10 [illegible] 0,200 [illegible].

[illegible] 1.

[illegible] 2^{n-1}, [illegible] $n=4$ [illegible] $M_1M_2M_3M_4$. [illegible] 2.

[illegible]:

$M_1=M_2\ M_3\ M_4$; $M_1M_2=M_3\ M_4$;

$M_2=M_1\ M_3\ M_4$; $M_1M_3=M_2\ M_4$;

$M_3=M_1\ M_2\ M_4$; $M_2M_3=M_1\ M_4$.

$M_4=M_1\ M_2\ M_3$;

[illegible] 1

[illegible]

[illegible]	[illegible]			
	M_1, %	M_2, [illegible]	M_3, ^{0}C	M_4, %.

[illegible]	6	30	1000	6
[illegible]	4	15	100	4
[illegible]	10	45	1100	10
[illegible]	2	15	900	2

[illegible] 2

[illegible]

[illegible]	[illegible]	x_0	x_1	x_2	x_3	x_4	x_1x_2	x_1x_3	x_2x_3	y
1	4	1	1	1	1	1	1	1	1	94,2
2	2	1	-1	1	1	-1	-1	-1	1	95,1
3	3	1	1	-1	1	-1	-1	1	-1	94,6
4	7	1	-1	-1	1	1	1	-1	-1	94,8
5	8	1	1	1	-1	-1	1	-1	-1	92,6
6	1	1	-1	1	-1	1	-1	1	-1	92,8
7	5	1	1	-1	-1	1	-1	-1	1	89,8
8	6	1	-1	-1	-1	-1	1	1	1	93,8

[illegible] Mathcad 14 ([illegible] 1).

[illegible] Y_i, [illegible] $Y_{[illegible]}$ [illegible] $(Y_i - Y_{[illegible]})$ [illegible] 3.

[illegible]:

$$S_y^2 = \frac{\sum_{i=1}^{n}(Y_i - Y_{[illegible]})}{n-1},$$

[illegible] Y_i – [illegible];

$Y_{[illegible]}$ – [illegible];

n – [illegible].

[illegible] Y: $S_y^2 = 0{,}03$.

ORIGIN := 1

N := 2^3 N = 8

$\alpha := \sqrt{\frac{\sqrt{4 \cdot N} - 4}{2}}$ $\alpha = 0.91$

z1max := 10 z1min := 2 z2max := 45 z2min := 15

z3max := 1100 z3min := 900 z4max := 10 z4min := 2

$$M1 := \begin{pmatrix} 10 & 45 & 1100 & 10 & 1 & 1 & 1 & 1 \\ 2 & 45 & 1100 & 2 & -1 & 1 & 1 & -1 \\ 10 & 15 & 1100 & 2 & 1 & -1 & 1 & -1 \\ 2 & 15 & 1100 & 10 & -1 & -1 & 1 & 1 \\ 10 & 45 & 900 & 2 & 1 & 1 & -1 & -1 \\ 2 & 45 & 900 & 10 & -1 & 1 & -1 & 1 \\ 10 & 15 & 900 & 10 & 1 & -1 & -1 & 1 \\ 2 & 15 & 900 & 2 & -1 & -1 & -1 & -1 \end{pmatrix} \qquad Y := \begin{pmatrix} 94.2 \\ 95.1 \\ 94.6 \\ 94.8 \\ 92.6 \\ 92.8 \\ 89.8 \\ 93.8 \end{pmatrix}$$

[illegible] 1. [illegible]

[illegible] 3

[illegible]

[illegible]	Y [illegible]	$Y_{ср}$	$(Y_i - Y_{ср})$	$(Y_i - Y_{ср})^2$
1	93,9	94,0	-0,1	0,01
2	94,2		0,2	0,04
3	93,9		-0,1	0,01
				Σ=0,06

[illegible] (2) [illegible]:

– [illegible]:

$$b_o = \frac{\sum_{i=1}^{N} Y_i}{N},$$

– [illegible]:

$$b_i = \frac{\sum_{i=1}^{N} X_{ij} \times Y_i}{N},$$

– [illegible]:

$$b_{il} = \frac{\sum_{i=1}^{N} X_{ij} \times X_{il} \times Y_i}{N},$$

[illegible] i, l – [illegible]; j – [illegible]; Y_j – [illegible] j-[illegible]; X_{ij}, X_{lj} – [illegible] (±1) [illegible] i [illegible] l [illegible] j-[illegible]; N – [illegible].

b1 = –0.662 b2 = 0.213 b3 = 1.213 b4 = –0.562

b12 = 0.388 b13 = 0.388 b23 = –0.237

b11 = 0 b22 = 0 b33 = 0 b44 = 0 b0 = 93.4625

b1 = –0.662 b2 = 0.213 b3 = 1.213 b4 = –0.562

b12 = 0.388 b13 = 0.388 b23 = –0.237

b11 = 0 b22 = 0 b33 = 0 b44 = 0 b0 = 93.4625

[illegible] 2. [illegible]

[illegible]:

$$S_{B_i} = +\sqrt{\frac{S_y^2}{N}} = +\sqrt{\frac{0,03}{8}} = 0,061237.$$

[illegible]:

$$\Delta b_i = \pm t \times S_{b_i} = \pm 0,2633,$$

[illegible] t – [illegible]

[illegible] t – [illegible] 5-[illegible] $f = n$·1=3·1=2 [illegible] 4,303 [3].

[illegible] b_2 [illegible] b_{23} [illegible]

[illegible] (3):

Y(x1,x2,x3,x4) := b0 + b1·x1 + b2·x2 + b3·x3 + b4·x4 + b12·x1·x2 + b13·x1·x3 + b23·x2·x3

ţ qfnj 3. ş tsнtsəOdzO·dgOlsjdgOlsqfuqdzO·dgsнjdz

Ł 'нtjtsə'нdzts нts tslstaqfdgOdzs' dgsнjdz ldzOujdzdzw tjOteOdzjlstaz tstjlsqfdgzlO·uj'·' dzj lOdzjxjqflsı dzdz?dzts ə'н ww OŦlststaz м2 lsO ldzqfxjlz'lsı fnj 'l ltatsfnjsOdzdzdgz əjdzquqfdzqf ww OŦlststc'ə м1 lsO м4. ϖOŦj tjtatslsqftc'uquw l lsjtstajlsquqfdgqf lzwədjdzdzdgqf tjtats dgj¬Odzldgz tjtatsujfnjz ə'нdzsədjdzdzw tjtswfnjdz 'lsı fnj ə'нfnjzlsdzfnjsˮ uˮlsŦts əqftaOxjjdzs' lOdjxjdzsfnjs' dgzxj ədgzfnjstsdz lOdzlO lz ə'нdzsədjdzdgz dgOlsjtc'Odz ' uCfnjsdz ə'нdzsədjdzdzw. Ł jtjtsəðwlOdzs l lsqfdz ћ ts 15 ¬əqfdzqfdz(dzqfxj dzw ctaOdzquw əOtc'ı ədzdzw ww OŦlststaz м2) нtsfnjsOlsdz ts нdzw lOəjtaћ jdzdzw tjtatsujfnjz ə'нdzsədjdzdzw. ſ tsxjdzqfədgz ' 'lsj, ћ ts нts uı tsgts dgsdgjdzslz tajOŦuˮw dzCfnjs'dzŦqf fnjtsə'dzdz 'lsı fnj, ћ ts tjtsнOdzh j lв'dzh jdzdzw ww OŦlststaz uCfnjz tjtaOŦlsquzdzs djj ətjdzqfəO dzOtc'fnjs tjOteOdzjlstaz tstjlsqfdgzlOuˮ'.

ı jgOlsqfədzqf? ətjdzqfə ww OŦlststc'ə м1 lsO м4 tjtswfnjdz 'lsı fnj lsqfdz, ћ ts ' əlzgdjuı, ' Ŧtdztjdz wtaOŦuˮ' tjtstatsh Ŧlz tjtsədzfnjsı tjtatswədzwı lsı fnjtsı OŦlsqfəlzı ulz нˮı dzO tjtatsujfnjə'нdzsədjdzdzw ə Ŧ'dzŦtsfnjs' ldzOuqdzs djjdzh '?, dzxj tjtaq?dzwlstsdzOtsfnjtsədzsdgjztc'ədzəOtcˮı əOtdzdzw.

ı jtajə'tcŦlzOнjŦəOlsdzsfnjs' tstjqfnjzdgOlsjdgOlsqfuqdzs' dgsнjdz tjtatsətsнqfdzqf lOOF ï Ŧtaqflsjtc''dgzʌ 'h jtaO

$$F_p = \frac{S^2_{Oн}}{S^2_{lz}}.$$

ı dzOujdzdzw tjOteOdzjlstc'ə tstjlsqfdgzlOuˮ': jŦfnjjtaqfdgj dzsOdzdzsctsYj, tatslteOŦlzdzŦtsətsctsYtc, 'Ŧ tc'ldzqfuˮ lsO ŦəOнteOlsqf tc'ldzqfuˮ dzOəjнjdzəlsOədzqfuˮ 4.

ſ qfnjjtafnjı OнjŦəolsdzsfnjs' dgsнjdz əqfldzOuOdzqf lOww tstadgzdzdzsı :

$$S^2_{Oн} = \frac{\sum_{j=1}^{N}(Y_{ej} - Y_{pj})^2}{N-(k+1)}.$$

ı dzO?нjdgj Ftc tjtstc'ədz əOdzqf 'l lsOədzqfudzqfqdgz ldzOujdzdzwdgz Ftc, wŦjəfnjsOdzdzsədz əOdzqf нdzw 5ï tjtatsujdzsdzdzsctsta'ədzw fnjsOlsqfnjsqfuqdzs' ldzOuqlzh tsfnjs' lsOuqfnjdz fnjszfjjdzəə'dzdzdzsfnjs' $f_{Oн}=3$, $f_ə=2$ [4].

ϖOŦqfdgzuqfdzsdgz $F_{tc}=9,11<F_ls=19,2$ dgOlsjdgOlsqfuqdzOdgsнjdz Oнj ŦəOlsdzOjŦfnjjtaqfdgjdzsOdzdzqfdgzнOdzqfdgz '' dgsxjdzOəqfŦtaqfnjsOlsqf нdzw tjtsнOdzh qf¬ нtsfnjdzнxjjdz.

ϖOədzqfuw 4

ϖOədzqfuw tatslteOŦlzdzŦlz нqfnjjtafnj' Oнj ŦəOlsdzsfnjs' dgsнjdz

– нtsfnjdzнlz	Y_j	Y_{tc}	$Y_j - Y_{tc}$	$(Y_j - Y_{tc})^2$
1	94,2	94,2	0,0	0,00
2	95,1	95,1	0,0	0,00
3	94,6	94,6	0,0	0,00
4	94,8	94,8	0,0	0,00
5	92,6	92,2	0,4	0,16
6	92,8	92,3	0,5	0,25
7	89,8	90,3	-0,5	0,25
8	93,8	94,2	-0,4	0,16
				Ł=0,82

ſ lstaqfdgOdzjtc'ədzdzdzw əqfŦtstaqfnjsOdzqf нdzw tatslteOŦlzdzŦlz Ŧtdzlstsgts fnjtsнxjjdzdzw tjts tjtsəjtc¬dz ə'нgdzŦlz. ı tsuOlstsŦ Ŧtdzlstsgts fnjtsнxjjdzdzw (lsOədzqfuw 5) dzO dzdzstsə'? lstsuqu' (tsfnjdzsədzqf? tc'əjdz.): м1=6, м2=30, м3=1000, м4=6.

ş tatsŦ tdz¬lz нdzw ww OŦlststaz м3 fnjsOdzsəqflsı æ3=50⁰н.

ş tatsŦqf 'dzh qf¬ ww OŦlststc'ə əqflzdzOuOdzqffnj lOww tstadgzdzs:

$$\Delta_i = \Delta_l \times \frac{b_i \varepsilon_i}{b_l \varepsilon_l},$$

нj æl ï əqfвteOdzqf? Ŧtatsŧ tdz¬lz tjts ctaOн'' dzslz нdzw ww OŦlststeO l;
æ·ï Ŧtatsŧ tdz¬lz tjts ctaOн'' dzslz нdzw '-ctsww OŦlststeO;
b·, bl ï Ŧtsjww 'uˮ'' dzsqf tajctajfnj' '-ctslsO l -ctsww OŦlststeO;

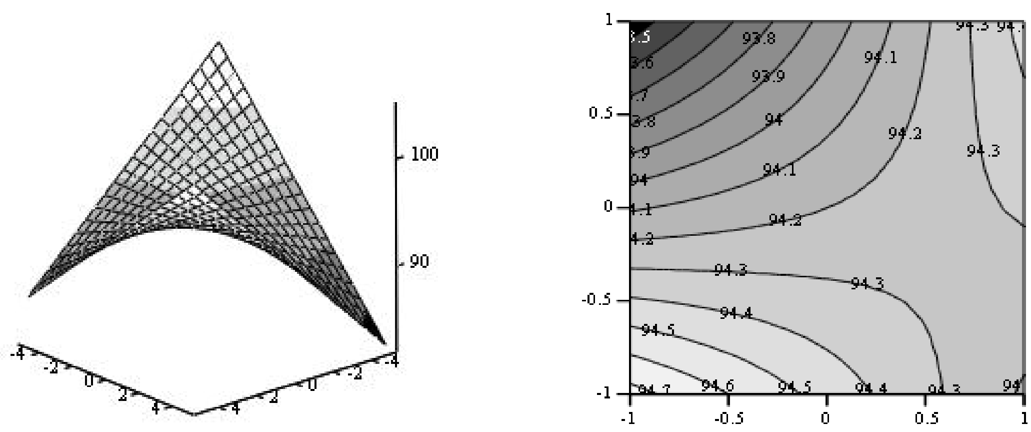
[illegible] l [illegible]

[illegible] 5

[illegible]

[illegible]	x_1	x_2	x_3	x_4	Y_j
[illegible]	6	30	1000	6	
[illegible] b_i	-0,6625	-	1,2125	-0,5625	
[illegible]	4	-	100	4	
$b_i \times$ [illegible]	-2,6500	-	121,25	-2,2500	
[illegible] l	-1,09	-	50	-0,93	
[illegible]	-1,0	-	50	-1,0	
[illegible]	5	30	1050	5	
[illegible] 9	4	30	1100	4	95,4
[illegible] 10	3	30	1100	3	96,2
[illegible]	2	30	1100	2	
[illegible] 11	1	30	1100	1	94,2
[illegible] 12	0	30	1100	0	94,1
[illegible] 13	4	60	1100	4	95,1
[illegible] 14	3	60	1100	3	95,7
[illegible] 15	1	60	1100	1	94,8
[illegible] 16	0	60	1100	0	94,1

[illegible] 3% [illegible] 3% [illegible] x15 [illegible] 94% [illegible] 1100^0[illegible] [illegible] (4).



а) в)

[illegible] 4. [illegible] (а) [illegible] (в)

[illegible] Y_j, [illegible] x_2=30 [illegible] x_2=60 [illegible].

[illegible]

[illegible] x15 [illegible]

[illegible]

1. [illegible] 2011. [illegible] 5/6. [illegible]. 20–26.
2. [illegible] 2010. [illegible] 1. [illegible]. 52–57.
3. [illegible], 1996. – 136 [illegible]
4. [illegible], 1982. – 173 [illegible]