

Лабораторная работа №1
10 июня
Письменные Аудиомаски

Задание

127 (1.3)

a) - 4B

b) 9B

затраченное
на обработку 1
изделия

Общий фонд
раб. времени
оборуд.

	A ₁	A ₂	
Ф	2	4	240
T	2	1	162
Ш	1	7	350
проверка	200	250	
нижнее огр.	10	15	
верхнее огр	70	48	

Решение:

1

$$x_1 \rightarrow A_1$$

$$x_2 \rightarrow A_2$$

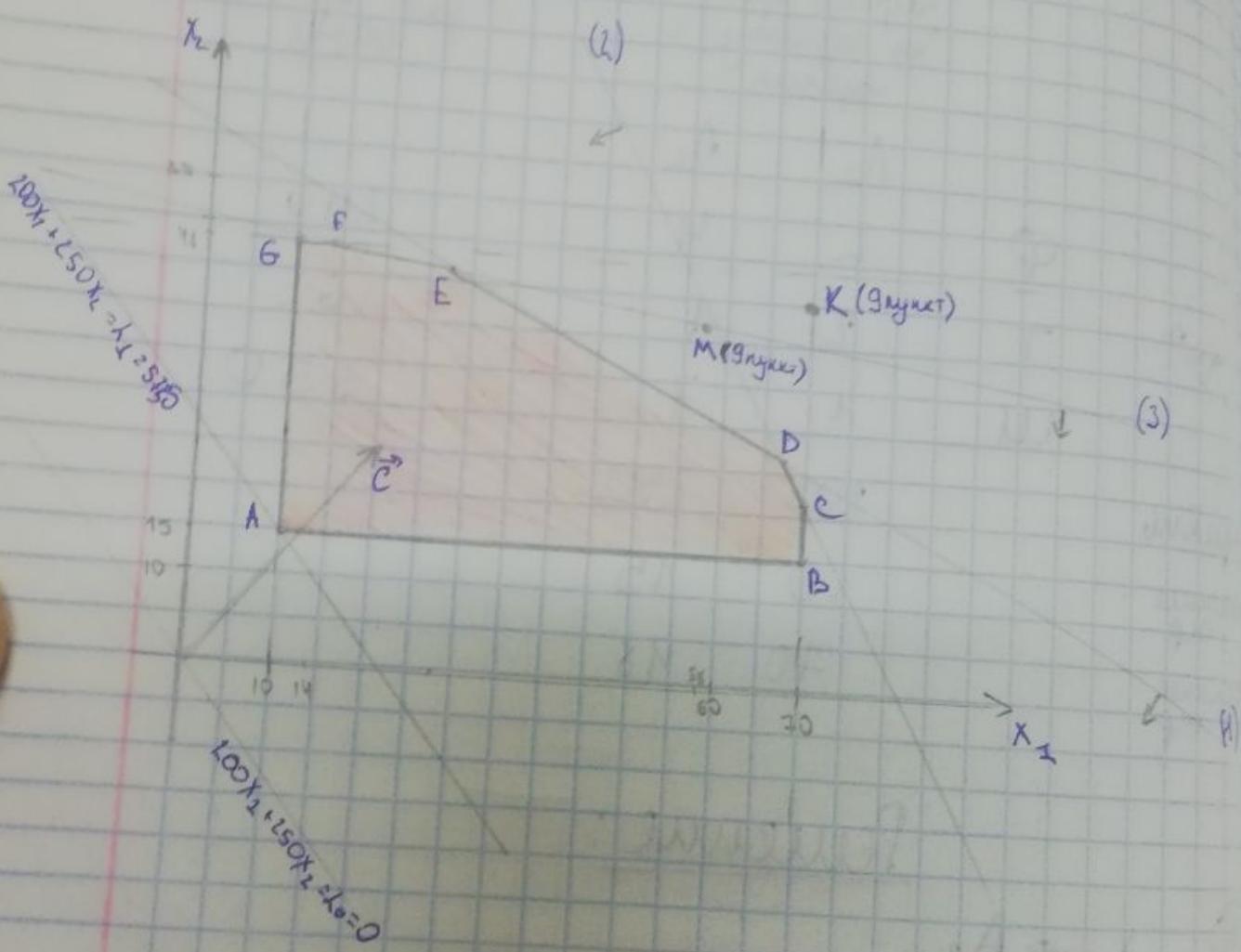
Составим линейную Ф-цию

$$200x_1 + 250x_2 \rightarrow \max (\min)$$

$$\begin{cases} 2x_1 + 4x_2 \leq 240 & (1) \\ 2x_1 + x_2 \leq 162 & (2) \\ x_1 + 7x_2 \leq 350 & (3) \end{cases}$$

$$10 \leq x_1 \leq 70$$

$$15 \leq x_2 \leq 48$$



T. min - небає може відсаму -> A

T. max - може. може відсаму. належать

$C' = (200, 250)$ - більш - відповідь

$$\operatorname{tg} \alpha_C = \frac{250}{200} = 1,25$$

$$\operatorname{tg} \alpha_{A1} = 2$$

$$\operatorname{tg} d_{(2)} = \frac{1}{2} = 0,5$$

$$\operatorname{tg} d_{(3)} = 4$$

$\Rightarrow \operatorname{tg} d_{(2)} < \operatorname{tg} d_{(c)} < \operatorname{tg} d_{(1)} \Rightarrow$
тогда непрерывные $d_{(1)}$ и $d_{(2)}$ и есть

$T_{\max} = T \cdot D$

Наиболее удобные координаты:

$$\begin{cases} 2x_1 + 4x_2 = 240 \\ 2x_1 + x_2 = 162 \end{cases} \quad \begin{cases} 2x_1 = 240 - 4x_2 \\ 240 - 4x_2 + x_2 = 162 \end{cases}$$

$$\begin{cases} 2x_1 = 136 \\ x_2 = 26 \end{cases} \Rightarrow D(68, 26)$$

$$T_{\max} = \varphi(68, 26) = 13600 + 6500 = 20100$$

\Rightarrow Удобны параметры макс. времени

нас превышести: 68 единиц пружинки A_1
26 единиц пружинки A_2

Хватит ли ресурсов?

(1) и (2) использованы полностью

(3) : остался неиспользованный ресурс

5

Задача

математическая

формула

$$\begin{aligned} \Phi(X) &= 200X_1 + 250X_2 \rightarrow \max \\ \begin{cases} 2X_1 + 4X_2 + X_3 \\ 2X_1 + X_2 \\ X_1 + 7X_2 \end{cases} &\begin{cases} = 240 \\ + X_4 = 162 \\ + X_5 = 350 \end{cases} \\ 10 \leq X_1 \leq 70 & 0 \leq X_3 \leq 160 \\ 15 \leq X_2 \leq 48 & 0 \leq X_4 \leq 127 \\ & 0 \leq X_5 \leq 20 \end{aligned}$$

3

на рисунке

4

$$d_3^* = \max(240 - 2X_1 - 4X_2) = 240 - 20 - 60 = 160$$

$$d_4^* = \max(162 - 2X_1 - X_2) = 162 - 20 - 15 = 127$$

$$\begin{cases} X_3^* = 0 \\ X_4^* = 0 \end{cases} \quad \begin{array}{l} \text{оправданное} \\ \text{чтобы} \end{array} \quad - \quad \begin{array}{l} \text{затраты} \\ \text{ресурсов} \end{array}$$

$$d_5^* = \max(350 - X_1 - 7X_2) = 350 - 10 - 105 = 235$$

$$X_1 + 7X_2 + X_5 = 350$$

$$68 + 182 + X_5 = 350$$

$$X_5 = 100$$

$$X_5^* = 100 - \text{Излишний} \Rightarrow$$

Решение

увеличение работы ЦД на 100 единиц

5) • A (10, 15)

$X^A = (10, 15, 160, 127, 135)$ - бюджетный план

$$A = \begin{pmatrix} 1 & 4 & 1 & 0 & 0 \\ 2 & 1 & 0 & 1 & 0 \\ 1 & 7 & 0 & 0 & 1 \end{pmatrix}$$

ИД - План о его
бюджетировании можно
говорить, если он базисный

Надеяться три вектора АНЗ \Rightarrow вектор X^* будет базисным

план установлен из базисных линий из узлов

$$A_5^1 = (a_3, a_4, a_5) - E$$

$$Y_5^1 = \{3, 4, 5\}$$

$$A_5^2 = (a_1, a_2, a_3)$$

$$Y_5^2 = \{1, 2, 3\}$$

если базис

• B (40, 15)

$X^B = (70, 15, 40, 7, 175)$ - не бюджетный план

$$Y_6^1 = \{1, 2, 3\}$$

$$Y_6^2 = \{3, 4, 5\}$$

базис.

• C (40, 22)

$X^C = (70, 22, 12, 0, 126)$ - не бюджетный план

$$Y_6^1 = \{1, 4, 5\}$$

$$Y_6^2 = \{1, 3, 5\}$$

базис

• D (68, 26)

$X^D = (68, 26, 0, 0, 100)$ - не бюджетный план

и

т.к.

решение?
нет решения

• T.A

$$A_5 (a_3 a_4 a_5) = \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$$

Low non-uniformity follows T.A
Dimensionless - Δ

Non-uniformity is due to boundary conditions
Therefore no convection \rightarrow now

$$100x_1 + 250x_2 \leftarrow \text{now}$$
6

~~many~~ Pushing in - $(10, 48, 28, 94, 4)$ \rightarrow $x_6 = (10, 48, 28, 94, 4)$
~~many~~ Pushing in - $(10, 48, 28, 94, 4)$ \rightarrow $y_6 = \{4, 2, 3\}$

$G(80, 48)$

~~many~~ Pushing in - $(14, 48, 20, 86, 0)$ \rightarrow $x_F = (14, 48, 20, 86, 0)$
~~many~~ Pushing in - $(14, 48, 20, 86, 0)$ \rightarrow $y_F = \{2, 5\}$

$F(14, 48)$

~~many~~ Pushing in - $(28, 46, 0, 60, 0)$ \rightarrow $x_E = (28, 46, 0, 60, 0)$
~~many~~ Pushing in - $(28, 46, 0, 60, 0)$ \rightarrow $y_E = \{3, 5\}$

$E(28, 46)$

$y_S = \{3, 4\}$ $y_H = \{3, 4\}$

$$\begin{pmatrix} 0 \\ 0 \\ 50 \\ 50 \end{pmatrix} = u \quad \begin{cases} h_1 + u_1 = 250 \\ 2h_1 + 2u_2 = 200 \\ u_3 = 0 \end{cases}$$

$$\begin{pmatrix} 0 \\ 0 \\ 250 \\ 200 \end{pmatrix} = \begin{pmatrix} 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} u_1 \\ u_2 \\ u_3 \end{pmatrix} \quad C = (200, 250, 0, 0, 0)$$

$$A^B = \begin{pmatrix} 1 & 1 & 1 \\ 2 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad Y^B = (1, 2, 55) \quad X^B = (68, 26, 0, 0, 100)$$

• T.D.

~~3x3~~ \Rightarrow now we can calculate
 \Rightarrow calculate our own numbers
~~from our own~~

$$\Delta_2 = 250 > 0 \quad (-) \quad X_2 = d_2 \\ \Delta_3 = C_1 - u_1 a_1 = 200 > 0 \quad (-) \quad X_3 = d_3$$

$$\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} = u$$

$$a_3 u = C_3$$

$$C = (200, 250, 0, 0, 0)$$

$$\Rightarrow A = (a_1, a_3, a_4) - \text{Hausdorffmaß}$$

$$= 200x_1 + 250x_2 - \left(\begin{array}{c} \vdots \\ h \end{array} \right) * p^2 = X^2 \quad X^2 < 0 \rightarrow 1150 < 0 - 250 - 200 = -250 = \nabla^2$$

$$\begin{pmatrix} -200 \\ 0 \\ 0 \end{pmatrix} = n$$

$$\lambda_5 = \lambda_1, \lambda_3, \lambda_4$$

$$A = (a_1, a_3, a_4) = \begin{pmatrix} 0 & 0 & 1 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

$$200x_1 - 250x_2 \leftarrow \max \quad X^* = (80, 15, 160, 124, 25)$$

$$200x_1 + 250x_2 \leftarrow \min$$

gelingt konstruktionsweise nur wenn

nur wenige Werte von geringer Dimension

4

\Leftrightarrow geringe Dimension

$$p \cdot X^* \quad 0 > c_5 = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} (0 \ 0 \ 5 \ 0) - 0 = 0$$

$$p \cdot X^* \quad 0 < c_5 = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} (0 \ 0 \ 5 \ 0) - 0 = 0$$

$$050 = x_3 +$$

$$x_1 + 2x_2$$

$$162 = x_1 +$$

$$2x_1 + x_2$$

$$242 =$$

$$2x_1 + x_2 + x_3$$

$$(x_1, x_2) = X$$

$$h(x) = 200x_1 + 250x_2 \rightarrow \max$$

soal. jumlah kota yang

jumlah kota yang

jumlah kota yang

jumlah kota yang

$$\leq A^2 (a_1, a_2, a_3) - \text{determinan}$$

$$(+)\Delta_1 = 0 - (-50 - 500) \quad x_1 = d_1^1 \quad \Delta_1 = 0 - (-50 - 500)$$

$$(+)\Delta_2 = 0 - (00 - 00) \quad x_2 = d_2^2 \quad \Delta_2 = 0 - (00 - 00)$$

$$\begin{pmatrix} 0 & 0 \\ 0 & -50 \\ 0 & -50 \end{pmatrix} = u$$

$$\left. \begin{array}{l} u_1 + u_2 = -50 \\ 2u_1 + 2u_2 = -200 \\ u_3 = 0 \end{array} \right\}$$

$$(2) A^2 = \begin{pmatrix} 1 & 1 & 0 \\ 2 & 4 & 0 \\ 0 & 0 & 0 \end{pmatrix} \quad y_1 = 1, 2, 55$$

$$\begin{aligned} \Theta_1 &= 60^\circ, \quad \Theta_2 = 122^\circ, \quad \Theta_3 = 80^\circ, \quad \Theta_4 = 124^\circ \\ \Theta &= (1, 0, -2, -2, -2) \\ O &= \gamma, \quad r = \gamma \\ r &= 10^\circ \end{aligned}$$

$$(-) \quad p^2 = x^2 \quad \Delta^2 = 250 > 0$$

$$(-) \quad *p = x \quad 0 < 00 = 200 - 0 = 200$$

Gequivalenz

$$\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} = n$$

$$A_s = \begin{pmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}, \quad Y_s = \{3, 4, 5\}$$

$$X_i = (10, 15, 160, 122, 235)$$

$$W_3 = 350 - 10 - 105 = 235 \geq 0$$

$$W_2 = 162 - 20 - 15 = 127 \geq 0$$

$$W_1 = 140 - 20 - 60 = 60 \geq 0$$

$$X = B - AX$$

$$0 \leq X_3 \leq 160$$

$$45 \leq X_2 \leq 94$$

$$10 \leq X_1 \leq 70$$

$$0 \leq X_5 \leq 235$$

$$0 \leq X_4 \leq 122$$

$$(-) \quad *^r p = ^r X$$

$$0 > 00 - \cos - 002 = \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix} (0.2500) - 002 = ^r I$$

$$\begin{pmatrix} 0 \\ 0.250 \\ 0 \end{pmatrix} = ^r u \Leftrightarrow ^r u = \begin{pmatrix} 0 \\ 0.250 \\ 0 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & t \\ 0 & 0 & 1 \\ 0 & 1 & 1 \end{pmatrix} A_2$$

Multiplikation:

$$S = \{2, 3, 5\}$$

$$X_3 = (0, 22, 12, 0, 126) - T.C$$

$$921 = 5h - 5t + 1 = \underline{X}, \quad 0^2 t - t = \underline{X}$$

$$71 = 82 - Ch = \underline{X}, \quad 22 = \underline{X}, \quad 0t = \underline{X}$$

$$\theta = \theta$$

$$52 = \underline{\theta}, \quad \theta_3 = \underline{\theta}, \quad \theta_2 = 10, \quad \theta_1 = 33, \quad \theta_0 = 0$$

$$t = \underline{s}, \quad r = \underline{j}, \quad h = \underline{g}, \quad \gamma = \underline{r}, \quad \lambda = \underline{z}, \quad \mu = \underline{o}$$

$$g \perp - (str, t, oh, sr, ot) = \underline{X}$$

$$52 = \underline{\theta} \perp \underline{\theta} = \underline{\theta} \Leftrightarrow \theta = \underline{\theta} = \theta = \theta$$

$$\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} = n$$

$$\begin{array}{l} \text{OS}_1 = n \\ \text{OS}_2 = n + 1 \\ \text{OS}_3 = n + 2 \\ \text{CO}_1 = n_1 + 2n_2 \\ \text{CO}_2 = n_1 + 2n_3 \\ \text{CO}_3 = n_1 + 2n_2 + 2n_3 \end{array}$$

$$A^2 = \begin{pmatrix} 1 & 1 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Augmenting matrix:

$$y_6 = (1, 2, 5)$$

$$(J \cdot I - (CO_1, 0, 0, CO_2) - I \cdot D) = X$$

$$x = 68, y = 26$$

$$z = \theta^3, \theta = 0^\circ$$

$$\begin{pmatrix} 126/13 \\ \infty \\ 2 \\ 13 \\ 60 \end{pmatrix} = \Theta$$

$$\begin{pmatrix} -13 \\ 0 \\ -6 \\ -2 \\ -1 \end{pmatrix} = C$$

$$\left\{ \begin{array}{l} e_1 = 2 \\ e_2 = 2 \\ e_3 = 6 \end{array} \right\} \leq$$

$$\left\{ \begin{array}{l} e_1 + 2e_2 + 2e_3 = 0 \\ -e_1 + 2e_2 + 2e_3 = 0 \\ -2e_1 + 4e_2 + 2e_3 = 0 \\ e_1 = -1, e_2 = 0 \end{array} \right.$$

$$e_3 = 6$$

Geometrie

$$A_s = \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{pmatrix}$$

$$y_b = \{3, 4, 5\}$$

$$(70, 48, 92, 126, 56) = X$$

$$\begin{array}{l} 0 \leq x_1 \leq 56 \\ 0 \leq x_2 \leq 56 \\ 0 \leq x_3 \leq 92 \\ 15 \leq x_4 \leq 48 \\ 10 \leq x_5 \leq 40 \end{array}$$

$$\begin{aligned} -x_5 &= 350 \\ -x_1 + 7x_2 &= 162 \\ -x_1 - x_2 + x_3 &= 240 \\ -x_1 + x_2 - x_3 &= -192 \\ -x_1 - x_2 - x_3 &= (X) \end{aligned}$$

$$w_3 = 350 - 40 - 336 = -56 < 0$$

$$w_2 = 162 - 140 - 48 = -26 > 0$$

$$w_1 = 240 - 140 - 192 = -92 < 0$$

$$\begin{aligned} C &= B - AX \\ (8h, 0t) &= X \quad \textcircled{g} \end{aligned}$$

$$\begin{pmatrix} 1 & 7 & 0 & 1 & 0 \\ 0 & 1 & -1 & 0 & 0 \\ -1 & 0 & 0 & 1 & 0 \end{pmatrix} \cdot A_s = \begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{pmatrix} \cdot \begin{pmatrix} 68 & 26 & 0 & 0 & 100 \end{pmatrix} = X^0$$

$$(+) *^h p = ^h X \quad 0 > 0 = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \quad \Delta^h = 0 - (50 \ 50 \ 0) = -50 < 0$$

$$(+) *^3 p = ^3 X \quad 0 > 0 = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \quad \Delta^3 = 0 - (50 \ 50 \ 0) = -50 < 0$$

know \leftarrow $\lambda - \bar{x} -$
mean \rightarrow

$$\begin{pmatrix} 0 & 0 & t \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix} = A^3 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

so $t = 1$, $A^3 = I$
 $\lambda = 1, 0, 0$ are eigenvalues
of A

$${}^{\text{E}}\Theta = \Theta^0$$

$$\theta = {}^s\Theta \quad 97 = {}^n\Theta, \quad \theta = {}^3\Theta, \quad \theta = {}^\infty\Theta$$

$$t^- = {}^s\gamma \quad 0 = {}^s\gamma - t^-$$

$$r^- = {}^n\gamma \quad 0 = {}^n\gamma - r^-$$

$$h^- = {}^3\gamma \quad 0 = {}^3\gamma - h^-$$

$$T^- = {}^2\gamma \quad 0 = {}^2\gamma$$

$$\gamma = 0$$

$$(-) \quad p = {}^2x \quad 0 > 21 = \binom{t}{h} (rrr) - 0 = {}^2\Delta$$

$$(-) \quad p = {}^2x \quad 0 > 5 = \binom{t}{2} (rrr) - 0 = {}^2\Delta$$

$$\binom{t}{r} = n$$

$$M_5 = \{1, 2, 3\} \quad A_6 = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 2 & 1 & 0 \end{pmatrix}$$

$$X^3 = (60 \frac{1}{13}, 41 \frac{5}{13}, 46 \frac{2}{13}, 0, 0) - \text{Twice } M$$

$$\theta_0 = \theta_4 = 126^\circ \approx 90^\circ$$

$$\theta_5 = \infty, \theta_1 = 60^\circ, \theta_2 = 56^\circ, \theta_3 = 126^\circ, \theta_4 = 130^\circ$$

$$\left. \begin{array}{l} \frac{t}{s} = 5 \\ \frac{t}{r} = 13 \\ \frac{t}{dr} = 3 \end{array} \right\}$$

$$\left. \begin{array}{l} 0 = -t + r^2 \\ 0 = -t - r^2 \\ 0 = -t + 2r^2 - dr^2 \\ 0 = -t - r^2 \end{array} \right\}$$

$$(-) * p = x$$

$$0 > \frac{t}{s} - = \frac{t}{s} + r - r - = \left(\frac{t/s}{r} \right) (r - r) - 0 = 0$$

$$\left(\frac{t/s}{r} \right) = n \quad \left. \begin{array}{l} s/n = -5 \\ r/n = -1 \\ -n = 1 \end{array} \right\}$$

$$0 \leq x_5 \leq 35$$

$$22 \leq x_5 \leq 0$$

$$26 \geq x_5 \geq 0$$

$$0 \leq x_1 \leq 35$$

$$0 \leq x_2 \leq 35$$

$$0 \leq x_3 \leq 35$$

$$0 \leq x_4 \leq 35$$

$$0 \leq x_5 \leq 35$$

$$0 \leq x_6 \leq 35$$

$$0 \leq x_7 \leq 35$$

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$$0 \leq x_9 \leq 35$$

$$0 \leq x_{10} \leq 35$$

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$$0 \leq x_{170} \leq 35$$

$$0 \leq x_{171} \leq 35$$

$$0 \leq x_{172} \leq 35$$

$$0 \leq x_{173} \leq 35$$

$$0 \leq x_{174} \leq 35$$

$$0 \leq x_{175} \leq 35$$

$$0 \leq x_{176} \leq 35$$

$$0 \leq x_{177} \leq 35$$

$$0 \leq x_{178} \leq 35$$

$$0 \leq x_{179} \leq 35$$

$$0 \leq x_{180} \leq 35$$

$$0 \leq x_{181} \leq 35$$

$$$$

$$\left. \begin{array}{l} e_3 = -6/13 \\ e_2 = -2/13 \\ e_1 = 1/13 \end{array} \right\}$$

$$\left. \begin{array}{l} v = e_1 + 2e_2 \\ 0 = 2e_1 + e_2 \\ 0 = 2e_1 + 4e_2 - e_3 \\ 0 = h \\ e_5 = 1 \\ e_4 = 5 \\ e_3 = 0 \end{array} \right\}$$

$$(-) \quad \begin{matrix} s \\ * \end{matrix} p = sX \quad 0 < \frac{13}{9} = \begin{pmatrix} -6/13 \\ 10/13 \\ 1 \end{pmatrix} (1000) - 0 = s \nabla$$

$$(-) \quad \begin{matrix} h \\ * \end{matrix} p = hX \quad 0 < \frac{13}{10} = \begin{pmatrix} -6/13 \\ 10/13 \\ 1 \end{pmatrix} (010) - 0 = h \nabla$$

$$\begin{pmatrix} -6/13 \\ 10/13 \\ 1 \end{pmatrix} = h$$

$$\left. \begin{array}{l} n = snt + ^2n \\ 9 = snt - 13n \\ t = 1/n \end{array} \right\} \quad \left. \begin{array}{l} a = snt + ^2n + h \\ c = snt + ^2n - 2 \\ t = 1/n \end{array} \right\}$$

$$\begin{matrix} \geq sX > 0 \\ \geq 121 \geq hX \geq 0 \\ \geq 25 \geq hX \geq 0 \end{matrix} \quad \begin{matrix} \geq 8h \geq 2X \geq 15 \\ 0t \geq hX \geq 0 \end{matrix}$$

$$\begin{matrix} 0.55 = sX + hX \\ 291 = hX + X \\ 0.55 = hX - X \end{matrix} \quad \begin{matrix} 2X + hX \\ 2X + X \\ 2X - hX \end{matrix}$$

now \leftarrow
higher

$$j = 40$$

$$y = \{1, 2, 5\}$$

$$\begin{cases} 0 \leq x_1 \leq 235 \\ 0 \leq x_2 \leq 120 \\ 0 \leq x_3 \leq 160 \\ 45 \leq x_4 \leq 84 \\ 0 \leq x_5 \leq 27 \end{cases}$$

$$0 \leq x_1 \leq 350$$

$$x_1 + x_2$$

$$21 \leq x_3 \leq 162$$

$$x_4 + x_5$$

$$240 \leq x_6 \leq 240$$

$$x_1^2 + x_2^2 + x_3^2$$

$$(-) \stackrel{sp}{*}$$

$$p(x) = 200x_1 + 250x_2$$

$$(-) \stackrel{p}{*}$$

Highly degenerate & open

numerous local minima

as many go to local place, a

the local minima = 0

$$y = \{1, 2, 5\} \quad \theta = 0^\circ$$

$$x = (68, 26, 0, 0, 0, 0)$$

$$x_2 = 41 \frac{13}{13} - \frac{13}{200} = 62$$

$$x_1 = 60 \frac{13}{13} + \frac{13}{100} = 68$$

$$\theta = 26.9^\circ$$

$$\theta_1 = \infty, \theta_5 = 235$$

$$\theta_3 = 60 \frac{13}{13} = 126 \quad \theta_4 = \frac{40 - 60 \frac{13}{13}}{13} = 100$$

~~AEM | AEL OX~~

$$0 = s_m + s_h - s_{\bar{h}}$$

$$0 = m + h - \bar{h}$$

$$0 = s_m + s_h - s_{\bar{h}}$$

$$057 = s_m + s_h - s_{\bar{h}} + s_{\bar{h}t} + s_{\bar{h}^2} + s_{\bar{h}^3}$$

$$007 = m + h - s_{\bar{h}} + s_{\bar{h}t} + s_{\bar{h}^2} + s_{\bar{h}^3}$$

$$m =$$

$$-235m^3 + 127m^2 + 160m^3 + 168m + 107 +$$

$$-150t^2 + 350t^3 - 1061 - 1061 = (x) t$$

Kombination Kurs:

$$55t^2 = 2,55$$

(68,26,0,0,1) : mehrere Möglichkeiten

$$72 \leq 5x \leq 30$$

$$74 \geq 4x \geq 30$$

$$91 \geq 3x \geq 0$$

$$15 \leq x_1 \leq 10$$

$$050 = x^5 + x^2$$

$$x^1 + x^2$$

$$162 = x^4 + x^3$$

$$x^2 + x^3$$

$$007 = 2x^1 + 4x^2 + x^3$$

$$x^1 + x^2$$

$$\varphi(x) = 200x_1 + 150x_2 \leftarrow \max$$

Kombination Kurs:



$$y_3 = \{3, u, 5\}$$

$$\begin{aligned} & \left. \begin{array}{l} 0 \leq x_5 \leq 235 \\ 0 \leq x_4 \leq 127 \\ 0 \leq x_3 \leq 160 \\ 15 \leq x_2 \leq 48 \\ 10 \leq x_1 \leq 30 \end{array} \right\} \quad \begin{array}{l} x_5 + x_4 = 350 \\ 2x_1 + x_2 = 162 \\ 2x_1 + x_2 + x_3 = 240 \end{array} \quad \begin{array}{l} x_1 + x_2 \\ 2x_1 + x_2 \\ 2x_1 + x_2 + x_3 \end{array} \\ & \quad \left. \begin{array}{l} x_1 + x_2 \\ 2x_1 + x_2 \\ 2x_1 + x_2 + x_3 \end{array} \right\} \quad \left. \begin{array}{l} x_1 + x_2 \\ 2x_1 + x_2 \\ 2x_1 + x_2 + x_3 \end{array} \right\} \quad \left. \begin{array}{l} x_1 + x_2 \\ 2x_1 + x_2 \\ 2x_1 + x_2 + x_3 \end{array} \right\} \end{aligned}$$

$$f(x) = 200x^2 + 250x^1 + 240 \leftarrow \max$$

11

$$\overline{f(x)} = f(x)$$

$$f(x) = 20100$$

$$x = (u, v, w)$$

$$x = (0, 0, 50, 50, 50, 0)$$

$$50 = u \quad 50 = v \quad 50 = w$$

$$50 = u \quad 50 = v \quad 50 = w$$

$$50 = u \quad 50 = v \quad 50 = w$$

$$y_1 = 50, y_2 = 50, y_3 = 0$$

$$u = (50, 50, 50)$$

$$001 = \frac{z}{\infty} - = \frac{p_1}{r_1} - = \tilde{n} \quad (4)$$

$$h- = \left(\begin{matrix} t \\ h \end{matrix} \right) (001) - = p_2 =$$

$$z- = \left(\begin{matrix} 1 \\ z \end{matrix} \right) (001) - = \left(\begin{matrix} 1 \\ z \end{matrix} \right) p_1 - =$$

$$p_1 = \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

$$\mathcal{T} = \begin{pmatrix} p_{11} & p_{12} \\ p_{21} & p_{22} \end{pmatrix} (001) \quad (5)$$

$$S = \int (h$$

$$(-) 95- = 350 - 0t - 336 = -56 \quad s^h \alpha$$

$$(-) 92- = 841 - 0h - 140 - 291 = h^h \alpha$$

$$(-) 76- = 261 - 0h - 140 - 191 = s^h \alpha$$

$$8h = z^h \alpha$$

$$0t = v^h \alpha \quad (3)$$

$$0 < 052 = z^h \alpha$$

$$0 < 002 = v^h \alpha \quad (2)$$

$$\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} = n(r)$$

Conclusion

$$\begin{aligned} (+) \quad 50Y &= {}^{5n}x \\ (-) \quad S - &= {}^{nn}x \\ (+) \quad SY &= {}^{rn}x \end{aligned} \quad \begin{aligned} 0t - 0S &= {}^{5n}x + {}^{rn}x \\ 0h1 - 291 &= {}^{nn}x + {}^{rn}x \\ 0h1 - 0h1 &= {}^{rn}x h \end{aligned}$$

$$0 = {}^{rn}x$$

$$0t_r = {}^{rn}xe \quad (3)$$

$$\begin{aligned} 0 > Sg - &= \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} (001) - 0 = {}^{5n}g \\ 0 < Sh = &\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} (122) - 002 = {}^{rn}g \quad (4) \end{aligned}$$

$$\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} = n \quad \begin{aligned} 0 &= 0 \\ 0 &= n \\ 0 &= rh \end{aligned}$$

$$0 = \begin{pmatrix} n \\ n \\ n \\ n \\ n \end{pmatrix} (0, 1, 0)$$

$$0 = \begin{pmatrix} n \\ n \\ n \\ n \\ n \end{pmatrix} (0, 0, 1) \quad 0S = \begin{pmatrix} n \\ n \\ n \\ n \\ n \end{pmatrix} (1, 1, 2, 2, 2)$$

$$\alpha = (70, 48, -32, -26, -56) - \text{terms } k$$

$$A_s = \begin{pmatrix} 2 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

$$\alpha = (22, 4, 5)$$

$$\gamma = \delta^* = \delta$$

$$G_2 = -\frac{P_s}{S_2} = -\frac{n}{250} = 625$$

$$\begin{pmatrix} 1 & \frac{1}{r} & \frac{1}{r^2} \\ 0 & 1 & \frac{1}{r} \\ 0 & 0 & 1 \end{pmatrix} = A^g \quad \{1, 2, 5\} = M$$

$$D = * D \leq$$

$$057 = \frac{h/r}{5/2} - = 62.5$$

$$05 = \frac{PS_2}{S_2} = \frac{3/2}{5/2} - = 70 \text{ (t)}$$

$$\frac{h}{r} = \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix} (0 + h/r) - = PS_2$$

$$\therefore \frac{h}{r} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} (0 + h/r) - = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} h/r - = PS_2 = -P_1 (2) \quad (6)$$

$$\begin{pmatrix} 0 & 1 \\ 1 & h/r \end{pmatrix} = nD$$

$$h/r - = P_1 \leq T - = h$$

$$O = \begin{pmatrix} S_n D \\ S_n D \\ S_n D \end{pmatrix} (T + h)$$

$$O = S_n D \quad \cancel{O = S_n D}$$

$$P_{nD} = f$$

$$f = \begin{pmatrix} S_n D \\ P_{nD} \\ P_{nD} \end{pmatrix} (O, 1, 0) \quad (5)$$

$$h = \int (h)$$

$$\Delta \downarrow - (001, 0, 0, 0) = \alpha$$

$$(+)\ 001 = {}^5\alpha$$

$$(+)\ 001 = {}^5\alpha$$

$$(+)\ 001 = {}^5\alpha$$

$$001 = {}^5\alpha$$

$$001 = {}^5\alpha$$

$$001 = {}^5\alpha$$

$$001 = {}^5\alpha + {}^7\alpha t + {}^7\alpha t^2$$

$$001 = {}^5\alpha + {}^7\alpha t + {}^7\alpha t^2$$

$$001 = {}^5\alpha + {}^7\alpha t + {}^7\alpha t^2$$

$$(+)\ 0 = {}^5\alpha$$

$$(+)\ 0 = {}^5\alpha$$

$$0 > 001 = \begin{pmatrix} 0 \\ 001 \\ 001 \end{pmatrix} (010) - 0 = {}^5\beta$$

$$0 > 001 = \begin{pmatrix} 0 \\ 001 \\ 001 \end{pmatrix} (001) - 0 = {}^5\beta$$

$$\begin{pmatrix} 0 \\ 50 \\ 50 \end{pmatrix} = n$$

$$\left\{ \begin{array}{l} u_1 = 50 \\ u_2 = 50 \end{array} \right.$$

$$\left\{ \begin{array}{l} 3u_1 = 150 \\ u_1 + u_2 = 100 \end{array} \right.$$

$$\left\{ \begin{array}{l} u_1 + u_2 = 100 \\ 4u_1 + u_2 = 250 \end{array} \right.$$

$$\left\{ \begin{array}{l} 4u_1 + u_2 = 250 \\ u_1 + u_2 = 100 \end{array} \right.$$

$$0 = {}^5n$$

$$001 = \begin{pmatrix} {}^5n \\ {}^7n \\ {}^7n \end{pmatrix} (t+1)$$

$$001 = \begin{pmatrix} {}^5n \\ {}^7n \\ {}^7n \end{pmatrix} (r+2)$$

Untersuchung 3:

Klausur

Während $\sum_{i=1}^n p_i \leq 1$ gilt

negativer Ertrag ist gleichzeitig negativer Nutzen ≤ 0

negative Nutzen und negative Ertrag ≤ 0

negative Nutzen und negative Ertrag ≤ 0

negative Nutzen und negative Ertrag ≤ 0

$$(0, 0, 0, 0, 0) = 0$$

$$(0, 0, 0, 0, 0) = 0$$

$$(0, 0, 0, 0, 0) = 0$$

12

$$x = (0, 0, 0, 0, 0) = 0 \Leftarrow$$