

6. (15 bodova) Simpleks metodom riješite:

$$P = 5x_1 + 4x_2 \rightarrow \max$$

$$2x_1 + x_2 \leq 11$$

$$x_1 + x_2 \leq 7$$

$$x_1 \geq 0, x_2 \geq 0$$

Riješi Simpleks-metodom:

$$P = 5x_1 + 4x_2 \rightarrow \max$$

$$2x_1 + x_2 \leq 11$$

$$x_1 + x_2 \leq 7$$

$$x_1 \geq 0, x_2 \geq 0$$

$$P = 5x_1 + 4x_2 + 0x_3 + 0x_4 \rightarrow \max$$

$$2x_1 + x_2 + 1x_3 + 0x_4 = 11$$

$$x_1 + x_2 + 0x_3 + 1x_4 = 7$$

$$x_1, x_2, x_3, x_4 \geq 0$$

C	0	5	4	0	0
B <sub>x</sub>	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>
x <sub>3</sub>	11	2	1	1	0
x <sub>4</sub>	7	1	1	0	1
Δ <sub>j</sub>	0	-5	-4	0	0

$$C_3 = 0$$

$$C_4 = 0$$

POČETNO RJEŠENJE:

$$x_1 \quad x_2 \quad x_3 \quad x_4$$

$$(0, 0, 11, 7)$$

$$A_j \min = -5 \text{ PA SE}$$

VEKTOR A<sub>1</sub> UVODI U BAZU.

$$\min \left\{ \frac{11}{2}, \frac{7}{1} \right\} = \frac{11}{2}$$

x<sub>31</sub> = 2 JE STOŽERNI ELEMENT  
TRANSFORMACIJE

i A<sub>3</sub> IZLAZI IZ BAZE

FORMULE ZA TRANSFORMACIJU TABLICE:

$$x_{ij}^{l+1} = \begin{cases} \frac{x_{rj}^l}{x_{rk}^l} & \text{za } i=r \text{ (REDAK U KOJEM JE STOŽERNI ELEMENT)} \\ x_{ij}^l - \frac{x_{rj}^l}{x_{rk}^l} \cdot x_{ik}^l & \text{za } i \neq r \text{ (REDAK U KOJEM NIJE STOŽERNI ELEMENT)} \end{cases}$$

$$\Delta_j = \sum_{i=1}^m c_i \cdot x_{ij} - C_j$$

$$C_1 = 5$$

$$C_4 = 0$$

C	0	5	4	0	0
B <sub>x</sub>	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>
x <sub>1</sub>	$\frac{11}{2}$	1	$\frac{1}{2}$	$\frac{1}{2}$	0
x <sub>4</sub>	$\frac{3}{2}$	0	$\frac{1}{2}$	$-\frac{1}{2}$	1
$\Delta_j$	$\frac{51}{2}$	0	$-\frac{3}{2}$	$\frac{5}{2}$	0

$$\text{Npr. } x_{40}^{(2)} = x_{40}^{(1)} - \frac{x_{30}^{(1)}}{x_{31}^{(1)}} \cdot x_{41}^{(1)} = 7 - \frac{11 \cdot 1}{2} = \frac{3}{2}$$

$$A_2 = \min = -\frac{3}{2}$$

A<sub>2</sub> ULAZI U BAZU

$$\min \left\{ \begin{array}{l} \frac{11}{2} \\ \frac{3}{2} \end{array} \right\} = \min \{ 11, 3 \} = 3 \Rightarrow x_4 \text{ IZLAZI IZ BAZE}$$

I BIT ĆE ZAMIJENJEN  
S x<sub>2</sub> U RJEŠENJU

$$A \quad x_{4,2} = \frac{1}{2} \text{ JE STOŽERNI ELEMENT}$$

TRANSFORMACIJE

$$C_1 = 5$$

$$C_2 = 4$$

C	0	5	4	0	0
B <sub>x</sub>	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>
X <sub>1</sub>	4	1	0	1	-1
X <sub>2</sub>	3	0	1	-1	2
Δ <sub>j</sub>	32	0	0	1	3

$$x_{ij}^{(l+1)} = x_{ij}^{(l)} - \frac{x_{rj}^{(l)}}{x_{rk}^{(l)}} \cdot \lambda$$

$$\rightarrow x_{ij}^{(l+1)} = \frac{x_{rj}^{(l)}}{x_{rk}^{(l)}}$$

Npr.  $x_{11}^{(3)} = x_{11}^{(2)} - \frac{x_{41}^{(2)}}{x_{4,2}} \cdot x_{1,2}$

$$= 1 - \frac{0}{\frac{1}{2}} \cdot \frac{1}{2} = 1$$

$$x_{12}^{(3)} = \frac{1}{2} - \frac{\frac{1}{2}}{\frac{1}{2}} \cdot \frac{1}{2} = 0$$

TD.

U OVOM KORAKU SU SVI Δ<sub>j</sub> ≥ 0 PA JE POSTOJEĆE RJEŠENJE OPTIMALNO

$$\Rightarrow (x_1, x_2, x_3, x_4) = (4, 3, 0, 0) \text{ JE } x_{opt}$$

OPTIMALNI IZBOR VARIJABLI  
A P<sub>max</sub> = 32

