

Garraio-Problema eta Esleipen-Problema. Soluzioak

1. Helburua minimizatzea duen garraio-problemaren matrize-forma:

	B_1	B_2	B_3	Eskaintza
E_1	100	100	50	15
E_2	650	110	100	15
E_3	60	65	75	15
E_4	150	90	70	15
Eskaria	30	16	14	

2. Helburua maximizatzea duen garraio-problemaren matrize-forma:

	S_1	S_2	S_3	Eskaintza
E_1	26	13	22	100
E_2	30	21	27	85
E_3	34	22	30	140
E_4	25	18	24	125
Eskaria	125	150	175	

3. Helburua maximizatzea duen garraio-problemaren matrize-forma:

	B_1	B_2	B_3	B_4	Eskaintza
E_1	60	40	45	55	130
E_2	70	55	65	60	200
E_3	80	60	55	75	170
E_4	$-M$	$-M$	0	0	50
Eskaria	150	175	175	50	

4. Helburua minimizatzea duen garraio-problemaren matrize-forma:

	1.astea	2.astea	3.astea	Eskaintza
Prest	0	15	30	2
1. asteen, lanorduetan	20	35	50	5
1. asteen, lanorduetatik kanpo	30	45	60	5
2. asteen, lanorduetan	M	30	45	4
2. asteen, lanorduetatik kanpo	M	40	55	5
3. asteen, lanorduetan	M	M	45	2
3. asteen, lanorduetatik kanpo	M	M	55	5
Eskaria	8	8	8	

5. Hasierako oinarriko soluzio bideragarrien kalkulua.

5.1 Ipar-mendebaldeko ertzaren metodoa erabiliz:

$$x_{11} = 300, x_{12} = 100, x_{22} = 200, x_{32} = 40, x_{33} = 400, x_{34} = 180, z = 14280.$$

Vogel-en metodoa erabiliz:

$$x_{14} = 400, x_{21} = 200, x_{31} = 100, x_{32} = 340, x_{33} = 140, x_{34} = 40, z = 11420.$$

5.2 Ipar-mendebaldeko ertzaren metodoa erabiliz, soluzioa endekatua da:

$$x_{11} = 10, x_{12} = 10, x_{13} = 10, x_{23} = 10, x_{24} = 20, x_{35} = 30, z = 3680.$$

Vogel-en metodoa erabiliz:

$$x_{14} = 10, x_{15} = 20, x_{21} = 10, x_{22} = 10, x_{33} = 20, x_{34} = 10, z = 2600.$$

5.3 Ipar-mendebaldeko ertzaren metodoa erabiliz:

$$x_{11} = 80, x_{21} = 20, x_{22} = 80, x_{32} = 20, x_{33} = 50, x_{34} = 5, x_{44} = 45, x_{45} = 75, x_{55} = 25, x_{56} = 35, x_{66} = 65, z = 10585.$$

Vogel-en metodoa erabiliz, soluzioa endekatua da:

$$x_{13} = 50, x_{16} = 30, x_{21} = 100, x_{35} = 75, x_{42} = 40, x_{45} = 10, x_{46} = 70, x_{52} = 60, x_{64} = 50, x_{65} = 15, z = 7300.$$

6. Soluzio optimoak eta garraio-kostu minimoak:

6.1 $x_{11}^* = 32, x_{21}^* = 20, x_{22}^* = 3, x_{32}^* = 30, x_{41}^* = 18, x_{43}^* = 22, x_{44}^* = 7, z^* = 1931.$

6.2 $x_{11}^* = 20, x_{14}^* = 10, x_{23}^* = 10, x_{24}^* = 2, x_{32}^* = 4, x_{34}^* = 1, x_{44}^* = 10, z^* = 782.$

6.3 Soluzio optimo anizkoitza, $z^* = 174.$

$$x_{11}^* = 3, x_{13}^* = 7, x_{24}^* = 3, x_{25}^* = 9, x_{31}^* = 1, x_{32}^* = 5, x_{34}^* = 6.$$

$$x_{12}^* = 3, x_{13}^* = 7, x_{24}^* = 3, x_{25}^* = 9, x_{31}^* = 4, x_{32}^* = 2, x_{34}^* = 6.$$

$$x_{11}^* = 4, x_{13}^* = 6, x_{23}^* = 1, x_{24}^* = 2, x_{25}^* = 9, x_{32}^* = 5, x_{34}^* = 7.$$

6.4 Soluzio optimo anizkoitza, $z^* = 199$.

$$x_{15}^* = 4, x_{23}^* = 6, x_{31}^* = 3, x_{32}^* = 4, x_{33}^* = 1, x_{34}^* = 1.$$

$$x_{13}^* = 1, x_{15}^* = 3, x_{23}^* = 6, x_{31}^* = 3, x_{32}^* = 4, x_{34}^* = 2.$$

6.5 Soluzio optimoa endekatua da, $z^* = 3784$.

$$x_{14}^* = 42, x_{22}^* = 40, x_{31}^* = 18, x_{32}^* = 10, x_{33}^* = 8, x_{35}^* = 12, x_{44}^* = 10.$$

6.6 Soluzio optimoa endekatua da, $z^* = 363$.

$$x_{12}^* = 10, x_{13}^* = 5, x_{22}^* = 5, x_{31}^* = 9, x_{34}^* = 3, x_{44}^* = 2, x_{51}^* = 6.$$

7. Esleipen-optimoa: $L_1 \rightarrow D, L_2 \rightarrow C, L_3 \rightarrow A, L_4 \rightarrow B$. L_5 laguna lanposturik gabe geratuko da. $z^* = 25$.

8. Esleipen-optimo anizkoitza, $z^* = 30$.

$K_1 \rightarrow H_2, K_2 \rightarrow H_4, K_3 \rightarrow H_1, K_4 \rightarrow H_3$. H_5 hiriko ekoizpen-zentroak beste garraio-entresa bati eskatu beharko dio kamioia.

$K_1 \rightarrow H_2, K_2 \rightarrow H_4, K_3 \rightarrow H_3, K_4 \rightarrow H_5$. H_1 hiriko ekoizpen-zentroak beste garraio-entresa bati eskatu beharko dio kamioia.

9. Esleipen-optimoa eta z^* :

9.1 $I_1 \rightarrow H_4, I_2 \rightarrow H_2, I_3 \rightarrow H_1, I_4 \rightarrow H_3, z^* = 27$.

9.2 $I_1 \rightarrow H_2, I_2 \rightarrow H_4, I_3 \rightarrow H_5, I_4 \rightarrow H_1, I_5 \rightarrow H_3, z^* = 29$.

9.3 $I_1 \rightarrow H_1, I_2 \rightarrow H_2, I_3 \rightarrow H_5, I_4 \rightarrow H_4, I_5 \rightarrow H_3, z^* = 55$.