

5.11.2022 / Blending Problem, max kar

x sıfır:

Yakıt 1 \swarrow Petrol 1
Yakıt 2 \swarrow Petrol 2
Yakıt 3 \swarrow Petrol 3

Yakıt	Sahis Fiyatı	Petrol	Alic. F.	Talep
1	70 ₺	1	45 ₺	3000 fm
2	60 ₺	2	35 ₺	2020 fm
3	50 ₺	3	25 ₺	1000 fm

Petrol	Oktan	Solfor(%)
1	12	0.5
2	6	2.0
3	8	3.0

Yakıt 1 en az 10 oktan, en fazla %1 solfor

Yakıt 2 en az 8 oktan, %2 solfor

Yakıt 3 6 oktan, %0.5 solfor

Hedef petrol $\frac{m}{4}$ yakıt, Günde max 14000 fm'lik üretimi var.

Kar maksimizasyonu, reklam harcaması 1 ₺ yakıt sahisi 10 fm'lik orta值.

1) Reklam harcaması para

2) karım bakiye

a): yakıt i için gerekli reklam maliyeti

x_{ij} : yakıt j içeriklerin miktarları i petrol miktarı

x_{13} : yakıt 1 içinde petrol 3'ün miktarı petrol f miktari

$$\text{Göntök geliri} = 70(x_{11} + x_{21} + x_{31}) + 60(x_{12} + x_{22} + x_{32}) + 50(x_{13} + x_{23} + x_{33})$$

$$\begin{aligned}\text{Göntök petrol malzemi} &= 45(x_{11} + x_{12} + x_{13}) + 35(x_{21} + x_{22} + x_{23}) \\ &\quad + 25(x_{31} + x_{32} + x_{33})\end{aligned}$$

$$\text{Reklam maliyeti} = a_1 + a_2 + a_3$$

$$\text{Üretim maliyeti} = 4(x_{11} + x_{12} + x_{13} + x_{21} + x_{22} + x_{23} + x_{31} + x_{32} + x_{33})$$

$$1. \text{kisit} \Rightarrow \text{Göntökün toplam göntök yakıt} = 3000$$

$$\boxed{\text{Toplam 13 kisit}} \quad \text{kisit yes.}$$

Constraints:

$$1) x_{11} + x_{12} + x_{13} \leq 5000$$

$$2) x_{21} + x_{22} + x_{23} \leq 5000$$

$$3) x_{31} + x_{32} + x_{33} \leq 5000$$

→ for soft for most 1% ; petrol 1

$$\frac{12x_{11} + 6x_{21} + 8x_{31}}{x_{11} + x_{21} + x_{31}} \geq 10$$

$$\text{so } 12x_{11} + 6x_{21} + 8x_{31} \geq 10(x_{11} + x_{21} + x_{31})$$

$$\therefore 4) 2x_{11} - 4x_{21} - 2x_{31} \geq 0$$

$$0.5x_{11} + 2x_{21} + 3x_{31} \leq x_{11} + x_{21} + x_{31}$$

$$\therefore 5) -0.5x_{11} + x_{21} + 2x_{31} \leq 0$$

\rightarrow for sulfur 2%, petrol 2

$$\frac{12x_{12} + 6x_{22} + 8x_{32}}{x_{12} + x_{22} + x_{32}} \geq 8$$

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$$12x_{12} + 6x_{22} + 8x_{32} \geq 8(x_{12} + x_{22} + x_{32})$$

$$\therefore 6) 4x_{12} - 2x_{22} \geq 0$$

$$0.5x_{12} + 2x_{22} + 3x_{32} \leq 2(x_{12} + x_{22} + x_{32})$$

$$\therefore 7) -1.5x_{12} + x_{32} \leq 0$$

\rightarrow max production 14000 per day

$$8) x_{11} + x_{21} + x_{31} + x_{12} + x_{22} + x_{32} + x_{13} + x_{23} + x_{33}$$

$$\leq 14000$$