

ΘΕΜΑ 1: $\max (-Z) = -x_1 - 2x_2 - 3x_3^+ + 3x_3^-$

υπό:
$$\begin{cases} x_1 + 2x_2 + x_4 = 40 \\ x_1 - x_2 + x_3^+ - x_3^- = 30 \\ -x_1 + 3x_2 + 2x_3^+ - 2x_3^- + x_5 = 50 \\ x_2 + x_3^+ - x_3^- - x_6 = 25 \end{cases}$$

$x_1, x_2, x_3^+, x_3^-, x_4, x_5, x_6 \geq 0$

ΘΕΜΑ 2: $y = \begin{cases} 0, & \text{οχι (ΥΠΕΡΟΡ.)} \\ 1, & \text{ΝΑΙ} \end{cases}$

Objective function: $\min \text{cost} = X * (1-y) * 50 + (8000 * 50 + (X-8000) * 70) * y$

υπό:
$$\begin{cases} X - 8000 \leq M \cdot y \\ X \geq 8000y \end{cases}; \quad X \geq 0, \quad y \text{ binary}$$

ΘΕΜΑ 3: α) ΘΕΡΙΑ

β) i) $Q = \sqrt{\frac{2KD}{K_c}} = 346$

ii) $Q' = \sqrt{\frac{2K'D}{K_c}} = 200$

$TC = \frac{Q}{2} K_c + \frac{D}{Q} K = 866$

$TC' = \frac{Q'}{2} K_c + \frac{D}{Q'} K' = 500$

$2 * (TC - TC') \leq 1000 \Rightarrow \text{OXI}$

ΘΕΜΑ 4: α) $p = \frac{\mu_s}{\mu_A} = 0.5$ $WTM_{M/M/1} = \frac{p}{1-p} = 1$

ii) $\mu_w = WTM \cdot \mu_s = 0.7$ ημέρες

i) $\mu_L = \frac{\mu_w}{\mu_A} = 0.5$

iii) $\mu_w + \mu_s = 0.7 + 0.7 = 1.4$ ημέρες

β) $CV_s = \frac{\sigma_s}{\mu_s} = 0.6$ $p = \frac{\mu_s}{\mu_A} = 0.357$

$WTM_{M/G/1} = \frac{p}{1-p} \left(\frac{1 + CV_s^2}{2} \right) = 0.377$

i) $\mu_w = WTM \cdot \mu_s = 0.189$ ημ.

ii) $\mu_w + \mu_s = 0.689$ ημ.

iii) $\mu_L = \frac{\mu_w}{\mu_A} = 0.134$

iv) Αφίξεις: $\frac{1}{1.4} = 0.71$ αφίξεις/ημέρα

$\Delta \mu_w = 0.512$ ημ/αφίξη

Saved time: 0.364 ημ/ημέρα

* 4000

$= 1456 < 1500 \Rightarrow \text{OXI}$