**Modelo matemático en formato de lenguaje de modelización (Lingo):**

SETS:

!Definición de Sets Primitivos;

Periodo /Ene, Feb, Mar, Abr, May, Jun/;

Maquina /CoRtadora, FresadoraV, FresadoraH, Taladro, Alisadora/; Producto /P1, P2, P3, P4, P5, P6, P7/: Beneficio;

!Fabricación de Sets Derivados;

Fabricacion (Periodo, Producto): UProducidas, UVendidas, UStock, MaxStock, CosteStock; CapMaquinas (Periodo, Maquina): HrsDispMaquina, MaquinasDisp, MaquinasMant; HrsProduccion (Maquina, Producto): HrsNecesarias;

ENDSETS DATA:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MaquinasDisp= | 4 | 2 | 3 | 1 | 1 |
|  | 4 | 2 | 3 | 1 | 1 |
|  | 4 | 2 | 3 | 1 | 1 |
|  | 4 | 2 | 3 | 1 | 1 |
|  | 4 | 2 | 3 | 1 | 1 |
|  | 4 | 2 | 3 | 1 | 1; |
| MaquinasMant= | 1 | 0 | 0 | 0 | 0 |
|  | 0 | 0 | 2 | 0 | 0 |
|  | 0 | 0 | 0 | 1 | 0 |
|  | 0 | 1 | 0 | 0 | 0 |
|  | 1 | 1 | 0 | 0 | 0 |
|  | 0 | 0 | 1 | 0 | 1; |

Beneficio= 10 6 8 4 11 9 3;

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| HrsNecesarias= | 0.5 | 0.7 | 0 0 0.3 0.2 | | | 0.5 |
|  | 0.1 | 0.2 | 0 0.3 0 0.6 | | | 0 |
|  | 0.2 | 0 | 0.8 0 0 0 | | | 0.6 |
|  | 0.05 | 0.03 | 0 0.07 0.1 0 | | | 0.08 |
|  | 0 | 0 | 0.01 0 0.05 0 | | | 0.05; |
| MaxStock= 100 | 100 | 100 100 | | 100 | 100 100 | |
| 100 | 100 | 100 100 | | 100 | 100 100 | |
| 100 | 100 | 100 100 | | 100 | 100 100 | |
| 100 | 100 | 100 100 | | 100 | 100 100 | |
| 100 | 100 | 100 100 | | 100 | 100 100 | |
| 100 | 100 | 100 100 | | 100 | 100 100; | |
| CosteStock= 0.5 | 0.5 | 0.5 0.5 0.5 | | | 0.5 0.5 | |
| 0.5 | 0.5 | 0.5 0.5 0.5 | | | 0.5 0.5 | |
| 0.5 | 0.5 | 0.5 0.5 0.5 | | | 0.5 0.5 | |
| 0.5 | 0.5 | 0.5 0.5 0.5 | | | 0.5 0.5 | |
| 0.5 | 0.5 | 0.5 0.5 0.5 | | | 0.5 0.5 | |
| 0.5 | 0.5 | 0.5 0.5 0.5 | | | 0.5 0.5; | |
| HrsDispMaquina= | 384 | 384 | 384 384 | | 384 | |
|  | 384 | 384 | 384 384 | | 384 | |
|  | 384 | 384 | 384 384 | | 384 | |
|  | 384 | 384 | 384 384 | | 384 | |
|  | 384 | 384 | 384 384 | | 384 | |
| ENDDATA | 384 | 384 | 384 384 | | 384; | |

!Maximizar el beneficio total;

[Beneficio\_Total]MAX=@SUM(Fabricacion(i,j): (Beneficio(j)\*UVendidas(i,j)-CosteStock(i,j)

\*UStock(i,j)));

!Restricciones de equilibrio:

Uds. Vendidas mes t + Uds. Stock mes t = Uds. Producidas mes t + Uds. Stock mes (t-1); @FOR(Fabricacion (mes,prod):

[Equilibrio] UVendidas(mes,prod) + UStock(mes,prod) = UProducidas(mes,prod) + @IF (mes#EQ#1,0,UStock(mes-1,prod));

);

!Capacidad de producción y disponibilidad de Máquina; @FOR(CapMaquinas(mes, maq):

[Produccion\_Disponibilidad] @SUM(Producto(prod): HrsNecesarias(maq,prod)\*UProducidas (mes,prod)) <= HrsDispMaquina(mes, maq)\*(MaquinasDisp(mes, maq) - MaquinasMant(mes,maq));

);

!Existencias en el mes de Junio; @FOR(Producto(prod):

[Existencias] UStock(6,prod) >= 50;

);

!Capacidad de almacenamiento; @FOR(Fabricacion(mes,prod):

[Capacidad\_Almacenamiento] UStock(mes,prod)<= MaxStock(mes,prod);

);