Donard de deuros Xij i : produção labria. J= survedo de deposto Mmc = 5X, + 10X, + 3X, + 3X, + 7X, + 5 X, 2+ (0X, +8X, 2+4X, 3)

| 1          | 0 \          |              | deposito.                                 |         |                       |         |
|------------|--------------|--------------|---|---------|-----------------------|---------|
| 50         | Dobolo       |              | 17  | 5       | apantala              | 1       |
| 5          | A            | 8p2 00       | 10  | 7       | 100                   | 19-1    |
| REALESSES. | 5            | 3            | 7   | S       | 25                    |         |
| -          | C            | (0           | 8   | 14      | 175                   |         |
| 39-        | 711          |              | 30  | 90      |                       |         |
| 3          | Necentral    | 08           | 2   | 1 (0    |                       |         |
| 30         | 1            |              | 2 1 3                                     | 1       |                       |         |
| 39         | A            | 80 30        | 0+  | 100 260 |                       |         |
| <b>33</b>  | 0            | 0 10         | + 15-                                     | 138188  |                       |         |
| 30)<br>30) | C            | 1 0          | 75  | 780     |                       |         |
| 222        | 2 1          | 00 3         | 7 90                                      | 1/1/    |                       |         |
| 10         | land.        | 80 1 34      |   | 1       |                       |         |
|            | .,           | /            | 9   |         |                       |         |
|            | Suca: XII    | = 80, X, -30 | , X <sub>2,2</sub> /0, X <sub>2,5</sub> = | S X33== | 75                    |         |
| Section 1  | 1            |              | ,   | ,       |                       |         |
| =          | - 2,0g -     | 4.01-10.2    | +18.S+78.4                                | = 1040  | - 1                   |         |
|            | 1.411:00.    | . 11-0       |   | , - 1 2 |                       |         |
| 9          | 0:408-0:     | is -> 1/=0   | 5   |         |                       |         |
| ) X        | "= 1 + 1 =   | :5 - V       | 10=7=5 N3=8<br>+10=7=5 N3=8               |         |                       |         |
|            | 12 11+13=    | 10           | +10=7=>0/2                                | -3      |                       |         |
| 2X         | 22-50 N2+N2- | +            | 5+18=1=>13=8                              | d       |                       |         |
| X          | 330/21/3=    | u -> (       | 72+8=4=>13=-                              | 7       |                       |         |
| A          | 1111         | ***          |   |         | 1                     |         |
| 1          | );+ /ix-C,   | ja a         | - 1 - R -                                 | > X13   | essel or who          | -       |
| 3 X        | 1 C=> U, +V  | 3-7=0+8      | 1-7-6 50                                  |         |                       |         |
| V          | 11/1/1       | 3 = -1+3     | 2   |         |                       | 10      |
| X          | 1 => () +V   | -6=-4+S      | -63-5                                     |         | X23 ~ Uni             | da live |
| D X        | 1+61/5=28    | 12-8=-4+10   | 3-8=0                                     |         | , 42                  |         |
| 鱼          | 00           |              |   |         |                       |         |
|            |              |              |   |         | Digitalizado com Camo | Soonnor |

| $ \frac{1}{100} = \frac{100}{100} = \frac{100}{100} + \frac{100}{100} = \frac$   | 1                   | 1 1 2 13                      |      |
|--|---------------------|-------------------------------|------|
| B $0^{(3)}$ $\frac{1}{3}$ $$   | A                   | 80 151 -5 (10) +15(2) 100     |      |
| Solution:<br>$X_{11} = 60, X_{13} = 5, X_{13} = 15, X_{23} = 35, X_{23} = 75$<br>Cusho<br>80.5 + 5.10 + 15.2 + 35.7 + 75.4 = 955<br>0.1 + 1/3 = 0.35<br>1.2 = 0.4 + 1/3 = 3<br>1.2 = 0.4 + 1/3 = 3<br>1.3 = 0.4 + 1/3 = 3<br>1.3 = 0.3 + 1/3 = 1<br>1.3 = 0.3 + 1/3 = 1   | B                   |                               |      |
| Solution:<br>$X_{11} = 80, X_{12} = 5, X_{13} = 15, X_{23} = 25, X_{23}$   | C                   | 0 (B) + 0(B) - (H) 75         |      |
| $\begin{array}{lll} & \lambda_{11} = 001  \lambda_{12} - 31  \lambda_{13} - 131  \lambda_{33} \\ & \lambda_{12} = 01  \lambda_{13} - 31  \lambda_{13} - 131  \lambda_{33} \\ & \lambda_{13} = 01  \lambda_{14} + \lambda_{15} - \lambda_{15} \\ & \lambda_{13} = 01  \lambda_{14} + \lambda_{15} - \lambda_{15} \\ & \lambda_{14} = \lambda_{15} + \lambda_{15} - \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} \\ & \lambda_{15} = \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda_{15} + \lambda$   |                     | 80/30/901                     |      |
| $\begin{array}{lll} & \lambda_{1} = 001  \lambda_{13} - 31  \lambda_{13} - 131  \lambda_{33} \\ & \lambda_{1} = 001  \lambda_{13} - 31  \lambda_{13} - 131  \lambda_{33} \\ & \lambda_{1} = 0  \lambda_{1} + \lambda_{1} = 0 \\ & \lambda_{11} = 0  \lambda_{1} + \lambda_{1} = 0 \\ & \lambda_{12} = 0  \lambda_{1} + \lambda_{2} = \lambda \\ & \lambda_{23} = 0  \lambda_{1} + \lambda_{2} = \lambda \\ & \lambda_{33} = 0  \lambda_{2} + \lambda_{3} = \lambda \\ & \lambda_{34} = \lambda_{13} + \lambda_{2} = \lambda \\ & \lambda_{13} = \lambda_{13} + \lambda_{13} = \lambda_{13} + \lambda_{13} = \lambda \\ & \lambda_{13} = \lambda_{13} + \lambda_{13} =$ | Saluria             |                               |      |
| Cube:<br>80.5+5.10+15.2+35.7+75.4=955<br>0.5+0.5+5.10+15.2+35.7+75.4=955<br>0.5+0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2=5<br>0.5+0.1+0.2   | X = 80,             | X13=2, X13=12, X23=32, X33=35 |      |
| $ \begin{array}{lll} U_{1}+V_{3}=C_{1}y & U_{1}=0 \\ X_{11}=V_{1}+V_{1}=5 & V_{1}=5 \\ X_{12}=V_{1}+V_{2}=10 & V_{2}=10 \\ X_{13}=V_{1}+V_{3}=2 & V_{3}=2 \\ X_{23}=V_{2}+V_{3}=4 & V_{3}=2 \\ X_{23}=V_{3}+V_{3}=4 & V_{3}=2 \end{array} $ $ \begin{array}{lll} V_{3}=0 & V_{3}=0 \\ V_{3}=0 & V_{3}=0 \\ V_{3}=0 & V_{3}=0 \end{array} $ $ \begin{array}{lll} V_{3}=0 & V_{3}=0 \\ V_{3}=0 & V_{3}=0 \end{array} $ $ \begin{array}{lll} V_{3}=0 & V_{3}=0 \\ V_{3}=0 & V_{3}=0 \end{array} $ $ \begin{array}{lll} V_{3}=0 & V_{3}=0 \\ V_{3}=0 & V_{3}=0 \end{array} $ $ \begin{array}{lll} V_{3}=0 & V_{3}=0 \\ V_{3}=0 & V_{3}=0 \end{array} $   | Cuta                |                               |      |
| $X_{11} = 0 + V_{1} = 5$ $X_{12} = 0 + V_{2} = 10$ $X_{13} = 0 + V_{3} = 2$ $X_{12} = 0 + V_{3} = 2$ $X_{23} = 0 + V_{3} = 2$ $X_{23} = 0 + V_{3} = 1$ $0 + V_{3} = 0$ $0 + V$   | 80.54               | 5.10+15.2+25.7+75.4=955       |      |
| $X_{12} = 0.4V_0 = 10$ $X_{13} = 0.4V_0 = 10$ $X_{23} = 0.4V_0 = 3$ $X_{24} = 0.4V_0 = 3$ $X_{25} = 0.4V_0 = $   | 1:4/1/2 =(          | 11                            |      |
| $X_{13} = 0_{11} + 1_{3} = 1$ $X_{13} = 0_{11} + 1_{3} = 1$ $X_{12} = 0_{12} + 1_{3} = 1$ $X_{23} = 0_{2} + 1_{3} = 1$ $0_{13} + 1_{3} = 1$ $0_{13} + 1_{3} = 1$ $0_{2} + 1_{3} = 1$ $0_{3} = 1$   | $\chi_{11} = > O_1$ | 1+1,=5 1,=5                   |      |
| $X_{3} = 0_{1} + 1_{3} = 2$ $X_{12} = 0_{2} + 1_{3} = 7$ $X_{3} = 0_{3} + 1_{3} = 1$ $U_{3} + 1_{3} = 1$ $U_{3} + 1_{3} = 1$ $U_{3} + 1_{3} = 1$ $V_{3} = 0_{3} + 1_{3} = 1$ $X_{41} = 0_{4} + 1_{1} - 3 = -3 + 5 - 3 = -1$ $X_{41} = 0_{4} + 1_{1} - 3 = -3 + 5 - 3 = -1$   | X12=> Vi            |                               |      |
| $X_{23} = 0_{2} + 1_{3} = 7$ $X_{33} = 0_{3} + 1_{3} = 1$ $U_{1} + 1_{1} - C_{1} = 0$ $X_{21} = 0_{2} + 1_{1} - 3 = -3 + 5 - 3 = -1$ $X_{21} = 0_{2} + 1_{1} - 3 = -3 + 5 - 3 = -1$ $X_{21} = 0_{2} + 1_{1} - 3 = -3 + 5 - 3 = -1$   | X2301               | 11-1 13                       |      |
| $X_{33} = 3 U_3 + V_3 = 4$ $U_1 + V_1 - C_1 \dot{y}$ $X_{31} = 3 U_2 + V_1 - 3 = -3 + S - 3 = -1$ $X_{31} = 3 U_2 + V_1 - 3 = -3 + S - 3 = -6$   | X,2=>()             |                               |      |
| $V_{31} \Rightarrow V_{3} + V_{1} - C_{1} = -3 + S_{1} - 3 = -1$ $X_{31} \Rightarrow V_{3} + V_{1} - 3 = -3 + S_{1} - 3 = -6$  | Xxx                 | 3+V3=H                        |      |
| $X_{31} = 30_{3} + 11_{1-3} = 313_{1-6} = -6$  | 11 11.              | -C.,;                         |      |
| $X_{33} = 3 \cdot 0_{3} + \sqrt{1} - 6 = 3 + 3 - 6 = 1$ $X_{33} = 3 \cdot 0_{3} + \sqrt{1} - 6 = 3 + 3 - 6 = 1$ $X_{13} = 3 \cdot 0_{3} + \sqrt{1} - 6 = 3 + 3 - 6 = 1$ $X_{13} = 3 \cdot 0_{3} + \sqrt{1} - 6 = 3 + 3 - 6 = 1$  | 11                  | 1 111 2 2                     |      |
| X= 03+11-6= 2+8-6=1  | ١٤,                 | 1 11 -c= -3+9-2=-6            |      |
| X=03+11-6: 0 10 8=4 =0 =   | X23=21              | J2+13 - 7+8-6=1               | Jana |
| 131  | X31=>1              | 13+11-8=7+10-8=450 -> 20-     |      |
| X32=> 03+1/2-0-0.  | X37=>               | U3+V2-0-0                     | 1.1. |

|             |        | 2     | 3                   |         | 4-4  |        | 4     |
|-------------|--------|-------|---------------------|---------|------|--------|-------|
| A           | 80     | 0     | 30 100              |         |      |        |       |
| B           | 0+     | 98    | 0 25                | •       |      |        |       |
| C           | 0      | St    | 27 05               | _       |      |        |       |
|             | 180    | (30   | d0 1                |         |      |        |       |
| Lolue       | jo     | 20    | <i>Y 27c</i> V      | ~ V     | -70  |        |       |
|             | •      |       | (33-321X            |         | 33 ' |        |       |
| oku)        | S+ 90  | .7+35 | 7+8.8+              | 70.H =  | 935  |        |       |
|             | j=Cij  |       | ),=0                |         |      |        |       |
| X11=>       |        | )     | 1=5                 |         |      |        |       |
| X13=>       | V1+V3  | = J   | $\sqrt{3}=1$        |         |      |        |       |
| 3 x35=>     | 17 +11 | 9= 4  | 13-6                |         |      |        |       |
| X33=>       | 13+V   | 3=4   | $\int_{-2}^{3} = 9$ |         |      |        |       |
| 133<br>1341 | là-Ci  | ķ     |                     |         |      |        |       |
| X12=        | V+V    | -10=  | 0+6-19<br>1+5-3-    | ) = - M | nlec | ned in | e.    |
| = Xn =      | UztVI  | 3 =   | 172-2               | - 2     |      |        |       |
| - Y         | 11 TII | -     | 120                 |         | Χ    | dia 66 | sol o |
| X31-        | N=+1   | 1-6-  | 9+2-P               |         |      | 22     |       |

| 11123  |
|--|
| A 5 C(S) CUO 4 TH 100 V.O  |
| B 25(3) OFF OF 25  |
| C + 0 (1) 308 4 5H 75  |
| 180 130 1901   |
| Marie To   |
| X1=22 1X13=12 1X11=92 1X33=30 1X33=42  |
| Curto 21401-010  |
| SS.S+48.2+28.3+30.8+48.4=868   |
| 0;+Vi=Ciny U=0   |
| $X_{11} = 3U_1 + V_1 = 3$ $X_{12} = 3U_1 + V_2 = 3$ $X_{13} = 3U_1 + V_2 = 3U_3 = 3U_$ |
| $\chi_{12} - 2 \cup_{i} + V_{i} - 2$   |
| V. = 10+11=3   |
| X2=3U3+V2=8  |
| $X_{33}>0_3+V_3=4$ $U_3=3$   |
| 133300   |
| $V_{12} = V_1 + V_2 - 10 = 0 + 6 - 10 = -4$  |
| $X^{32} = 0^{1} + 1^{3} - 10^{2} = 0^{2} + 1^{2} - 10^{2} = 0^{2}$   |
| X2=U2+V2-7-1+7-C=-S  |
| X2=U2+V2-5=-2+2-5=-5<br>X2=U2+V3-5=-2+2-5=-5<br>X2=U2+V3-5=-2+2-5=-5   |
| X31=U2+V1-6- 2+3   |
| X33-> on below   |
|  |

49

| 1112131   |          |
|---|----------|
| A 10 0 90 100   |          |
| B 25 0 0 25   | 16137    |
| C/4S/30/0/7S  | X 1 -    |
| 180 30 90   |          |
| avulos  |          |
| X11=10 X13=00 1X21=75 X31=42 X33=30   | 7        |
| $\{c, \lambda\}$  | ,        |
| 10.5+40.7+35.3+42.6+30.8=815  |          |
| 1);+V;=Cin U,20   |          |
| X11=3U,+V1=9 V1=9   |          |
| $(X_{13}=)(1+1)_{3}=2$ $(Y_{3}=)_{1}$ $(Y_{3}=)_{2}$  |          |
| $\lambda_{11} = \lambda_{2} + \lambda_{1} = \lambda_{1}$  |          |
| $\chi_{31} = 0.03 + 1.02 = 0.03 = 1$ $\chi_{31} = 0.03 + 1.02 = 0.03 = 1$ $\chi_{31} = 0.03 + 1.02 = 0.03 = 1$            |          |
| 11.21(1)  |          |
| V;+V;-C13<br>X;=U,+V2-10=0+7-10=-3<br>C   | sor and  |
|   | " May    |
| 111119-6 = -9+9-2 = -8<br>X35=05+18   | ently of |
| $X_{33} = 03 + 13 - 1 = 1 + 3 - 4 = -3$ $X_{33} = 03 + 13 - 2 = -3 + 3 - 3 = -3$ $X_{33} = 03 + 13 - 2 = -3 + 3 - 3 = -3$ | pucon    |
| Na - Uat va   |          |

| 1   | ( A      | В                                       | C              | D    | E      | G             | Н                                      | 1  | J         | K | L    |
|-----|----------|---|----------------|------|--------|---------------|--|----|-----------|---|------|
| 1 2 |          | Circ                                    | o nor carga de |      |        |               |  |    |           |   |      |
| 3   |          | Custo por carga de caminhão<br>Armazéns |                |      |        |               | Variáveis de Decisão (xij)<br>Armazéns |    |           |   |      |
| 4   | Fábricas | 1                                       | 2              | 3    |        | Fábricas      | 1                                      | 2  | 3         |   |      |
| 5   | 1        | . 5                                     | 10             | 2    |        | 7./4 <b>(</b> | 80                                     | 20 | 0         |   |      |
| 6   | 2        | 3                                       | 7              | 5    |        | 2             | 0                                      | 10 | 15        |   |      |
| 7   | 3        | 6                                       | 8              | 4    |        | 3 3           | 0                                      | 0  | 75        |   |      |
| 8   |          |   |                |      |        |               |  |    |           |   | 10 M |
| 9   |          | min c                                   | 1045           |      |        |               |  |    |           |   |      |
| 10  |          |   |                |      |        | Armazém       |  | Ne | cessidade |   |      |
| 11  |          | Fábricas                                |                | Capa | cidade | 1             | 80 >=                                  |    | 80        |   |      |
| 12  |          | 1                                       | 100 <=         |      | 100    | 2             | 30 >=                                  |    | 30        |   |      |
| 13  |          | 2                                       | 25 <=          |      | 25     | 3             | 90 >=                                  |    | 90        |   |      |
| 4   |          | 3                                       | 75 <=          |      | 75     |               |  |    |           |   |      |
| E   | 130      |   |                |      |        |               |  |    |           |   |      |