

## Příloha č. 2:

Report programu GAMS – varianta 5

GAMS 30.3.0 rc5da09e Released Mar 6, 2020 WEX-WEI x86 64bit/MS Windows - 05/25/20 00:01:10 Page 1

General Algebraic Modeling System  
Compilation

```
1 Set t hours / t1*t24 / ;
2 */ vytvoreni promenne t
3 Table data(t, *)
4 */ vytvoreni tabulky data s promennou t
5   Dh   De   Dg   PV   lambda_e
6 t1  422.47  53.92  21.72  0   2.027
7 t2  422.47  47.66  21.72  0   2.027
8 t3  422.47  42.33  21.72  0   2.027
9 t4  422.47  43.77  21.72  0   2.027
10 t5  422.47  48.41  21.72  0   2.027
11 t6  422.47  53.97  21.72  0   2.027
12 t7  422.47  69.29  21.72  0   2.027
13 t8  422.47  82.1   21.72  0   2.027
14 t9  422.47  89.97  21.72  14.86  2.027
15 t10 422.47  90.92  21.72  27.04  2.027
16 t11 422.47  95.06  21.72  37.7   2.027
17 t12 422.47  99.6   21.72  24.11  2.653
18 t13 422.47  96.03  21.72  62.14  2.653
19 t14 422.47  87.79  21.72  56.01  2.653
20 t15 422.47  93.68  21.72  43.18  2.027
21 t16 422.47  102.65 21.72  0   2.027
22 t17 422.47  123.6  21.72  0   2.027
23 t18 422.47  147.78 21.72  0   2.027
24 t19 422.47  150.86 21.72  0   2.653
25 t20 422.47  149.18 21.72  0   2.653
26 t21 422.47  138.48 21.72  0   2.653
27 t22 422.47  119.33 21.72  0   2.653
28 t23 422.47  94.18  21.72  0   2.653
29 t24 422.47  70.79  21.72  0   2.027;
30 */ vstup hodnot do tabulky data
31 variable cost ;
32 */ zavedeni promenne cost - provozni naklady
33 positive variables E(t), E1(t), E2(t), E3(t), G(t), G1(t), G2(t),
34 Ed(t), Ec(t), H1(t), H2(t), H_ehp(t), SOC(t), DH(t), G3(t) ;
35 */ zavedeni kladnych promennych
36 binary variables lh(t), ldch(t), lch(t) ;
37 */ zavedeni binarnich promennych
38 scalar eta_ee / 0.96 / , eta_ge / 0.397 / , eta_gh / 0.527 / , eta_c / 0.9 / , eta_d / 0.9 / ,
39 COP / 2.47 / , H_ehpMax / 250 / , H_ehpMin / 0.3 / , Chpmax / 519 / , eta_he / 0.9 / , Fmax / 512 / ,
40 eta_ghf / 0.915 / , lambda_g / 1.763 / , SOCmax / 232 / , SOC0 / 0 / , lambda_dh / 2.4 / ;
41 */ zavedeni promennych s danymi hodnotami
42 H_ehp.up(t)=H_ehpMax ;
43 G1.up(t)=Chpmax ;
44 SOC0=0.2*SOCmax ;
45 SOC.up(t)=SOCmax ;
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46 SOC.lo(t)=0 ;
47 SOC.fx('t24')=SOC0 ;
48 G2.up(t)=Fmax ;
49 Ec.up(t)=20 ;
50 Ec.lo(t)=0 ;
51 Ed.up(t)=130 ;
52 Ed.lo(t)=0 ;
53 */ dodatecne upresneni hodnot promennych
54 Equations
55 eq1 , eq2 , eq3 , eq4 , eq5 , eq6 , eq7 , eq8 ,
56 eq9 , eq10 , eq11 , eq12 , eq13 , eq14 , eq15 , eq16 , eq17 ;
57 */ zavedeni potrebneho poctu rovnic s oznacenim
58 */ rovnice definujici matematicky model EnergyHub:
59 eq1.. cost =e= sum(t , data(t , 'lambda_e')*E(t)+lambda_g*G(t)+lambda_dh*DH(t)) ;
60 */ objektivni hodnotici funkce - soucet nakladu na energie
61 eq2(t).. E2(t)+eta_ge*G1(t)+Ed(t) =e= data(t , 'De')+E3(t) ;
62 */ tok elektricke energie z EnergyHubu
63 eq3(t).. eta_ee*E(t) + data(t , 'PV') =e= E1(t) + E2(t) ;
64 */ tok elektricke energie do EnergyHubu
65 eq4(t).. E1(t) =e= Ec(t) ;
66 */ definovani vstupu elektricke energie do baterioveho uloziste
67 eq5(t).. SOC(t) =e= SOC0$(ord(t)=1)+SOC(t-1)$(ord(t)>1)+Ec(t)*eta_c-Ed(t)/eta_d ;
68 */ zmena stavu urovne nabití baterioveho uloziste
69 eq6(t).. Ed(t) =l= 0.2*SOCmax*Idch(t) ;
70 */ omezeni vybijeni baterioveho uloziste
71 eq7(t).. Ec(t) =l= 0.2*SOCmax*Ich(t) ;
72 */ omezeni nabijeni baterioveho uloziste
73 eq8(t).. Idch(t)+Ich(t) =l= 1 ;
74 */ provozni rezim baterioveho uloziste (nabijeni/vybijeni)
75 eq9(t).. eta_ghf*G2(t) =e= H1(t);
76 */ fungovani plynoveho kotle
77 eq10(t).. G(t) =e= G1(t)+G2(t)+G3(t) ;
78 */ tok plynu do EnergyHubu
79 eq11(t).. G3(t) =e= data(t , 'Dg') ;
80 */ tok plynu z EnergyHubu
81 eq12(t).. eta_gh*G1(t)+H1(t)+H2(t)+H_ehp(t) =e= data(t , 'Dh') ;
82 */ tok tepla z EnergyHubu
83 eq13(t).. eta_he*DH(t) =e= H2(t) ;
84 */ fungovani tepelneho vymeniku
85 eq14(t).. H_ehp(t) =e= E3(t)*COP ;
86 */ vykon tepelneho cernadla
87 eq15(t).. H_ehp(t) =l= H_ehpMax*Ih(t) ;
88 */ omezeni maximalniho tepelneho vykonu tepelneho cernadla
89 eq16(t).. H_ehp(t) =g= H_ehpMax*Ih(t)*H_ehpMin;
90 */ omezeni minimalniho tepelneho vykonu tepelneho cernadla
91 eq17(t).. Ih(t) =l= 1 ;
92 */ provozni rezim tepelneho cernadla (chlazeni/topeni)
93 Model hub / all / ;
94 */ vytvoreni matematickeho modelu ze zadanych dat
95 Solve hub us mip min cost ;
96 */ prikaz pro reseni daneho modelu pomoci MIP resitele s minimalizaci promenne cost
97
98 Parameter report(t , *);
99 report(t , 'E(t)') = E.l(t);
100 report(t , 'PV(t)') = data(t , 'PV');
101 report(t , 'KVET - el') = eta_ge*G1.l(t);
102 report(t , 'E1(t)') = E1.l(t);

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103 report(t, 'G(t)') = G.l(t);
104 report(t, 'G1(t)') = G1.l(t);
105 report(t, 'G2(t)') = G2.l(t);
106 report(t, 'G3(t)') = G3.l(t);
107 report(t, 'Teplo - odber') = DH.l(t);
108 report(t, 'TV - teplo') = H2.l(t);
109 report(t, 'Kotel - teplo') = H1.l(t);
110 report(t, 'KVET - teplo') = eta_gh*G1.l(t);
111 report(t, 'TC - teplo') = H_ehp.l(t);
112 report(t, 'Ec(t)') = Ec.l(t);
113 report(t, 'Ed(t)') = Ed.l(t);
114 report(t, 'SOC(t)') = SOC.l(t);
115 display report;
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COMPILATION TIME = 0.000 SECONDS 3 MB 30.3.0 rc5da09e WEX-WEI

General Algebraic Modeling System  
Equation Listing SOLVE hub Using MIP From line 95

---- eq1 =E=

$$\text{eq1.. cost} - 2.027 * E(t1) - 2.027 * E(t2) - 2.027 * E(t3) - 2.027 * E(t4) - 2.027 * E(t5) - 2.027 * E(t6) - 2.027 * E(t7) - 2.027 * E(t8) - 2.027 * E(t9) - 2.027 * E(t10) - 2.027 * E(t11) - 2.653 * E(t12) - 2.653 * E(t13) - 2.653 * E(t14) - 2.027 * E(t15) - 2.027 * E(t16)$$

$$- 2.027 * E(t17) - 2.027 * E(t18) - 2.653 * E(t19) - 2.653 * E(t20) - 2.653 * E(t21) - 2.653 * E(t22) - 2.653 * E(t23) - 2.027 * E(t24) - 1.763 * G(t1) - 1.763 * G(t2) - 1.763 * G(t3) - 1.763 * G(t4) - 1.763 * G(t5) - 1.763 * G(t6) - 1.763 * G(t7) - 1.763 * G(t8) - 1.763 * G(t9)$$

$$- 1.763 * G(t10) - 1.763 * G(t11) - 1.763 * G(t12) - 1.763 * G(t13) - 1.763 * G(t14) - 1.763 * G(t15) - 1.763 * G(t16) - 1.763 * G(t17) - 1.763 * G(t18) - 1.763 * G(t19) - 1.763 * G(t20) - 1.763 * G(t21) - 1.763 * G(t22) - 1.763 * G(t23) - 1.763 * G(t24) - 2.4 * DH(t1)$$

$$- 2.4 * DH(t2) - 2.4 * DH(t3) - 2.4 * DH(t4) - 2.4 * DH(t5) - 2.4 * DH(t6) - 2.4 * DH(t7) - 2.4 * DH(t8) - 2.4 * DH(t9) - 2.4 * DH(t10) - 2.4 * DH(t11) - 2.4 * DH(t12) - 2.4 * DH(t13) - 2.4 * DH(t14) - 2.4 * DH(t15) - 2.4 * DH(t16) - 2.4 * DH(t17) - 2.4 * DH(t18) - 2.4 * DH(t19)$$

$$- 2.4 * DH(t20) - 2.4 * DH(t21) - 2.4 * DH(t22) - 2.4 * DH(t23) - 2.4 * DH(t24) =E= 0 ; (LHS = 0)$$

---- eq2 =E=

$$\text{eq2}(t1).. E2(t1) - E3(t1) + 0.397 * G1(t1) + Ed(t1) =E= 53.92 ; (LHS = 0, INFES = 53.92 ****)$$

$$\text{eq2}(t2).. E2(t2) - E3(t2) + 0.397 * G1(t2) + Ed(t2) =E= 47.66 ; (LHS = 0, INFES = 47.66 ****)$$

$$\text{eq2}(t3).. E2(t3) - E3(t3) + 0.397 * G1(t3) + Ed(t3) =E= 42.33 ; (LHS = 0, INFES = 42.33 ****)$$

REMAINING 21 ENTRIES SKIPPED

---- eq3 =E=

$$\text{eq3}(t1).. 0.96 * E(t1) - E1(t1) - E2(t1) =E= 0 ; (LHS = 0)$$

$$\text{eq3}(t2).. 0.96 * E(t2) - E1(t2) - E2(t2) =E= 0 ; (LHS = 0)$$

$$\text{eq3}(t3).. 0.96 * E(t3) - E1(t3) - E2(t3) =E= 0 ; (LHS = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq4 =E=

$$\text{eq4}(t1).. E1(t1) - Ec(t1) =E= 0 ; (LHS = 0)$$

$$\text{eq4}(t2).. E1(t2) - Ec(t2) =E= 0 ; (LHS = 0)$$

$$\text{eq4}(t3).. E1(t3) - Ec(t3) =E= 0 ; (LHS = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq5 =E=

$$\text{eq5}(t1).. 1.1111111111111111*Ed(t1) - 0.9*Ec(t1) + SOC(t1) =E= 46.4 ; (\text{LHS} = 0, \text{INFES} = 46.4 \text{ ****})$$

$$\text{eq5}(t2).. 1.1111111111111111*Ed(t2) - 0.9*Ec(t2) - SOC(t1) + SOC(t2) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq5}(t3).. 1.1111111111111111*Ed(t3) - 0.9*Ec(t3) - SOC(t2) + SOC(t3) =E= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq6 =L=

$$\text{eq6}(t1).. Ed(t1) - 46.4*Idch(t1) =L= 0 ; (\text{LHS} = 0)$$

$$\text{eq6}(t2).. Ed(t2) - 46.4*Idch(t2) =L= 0 ; (\text{LHS} = 0)$$

$$\text{eq6}(t3).. Ed(t3) - 46.4*Idch(t3) =L= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq7 =L=

$$\text{eq7}(t1).. Ec(t1) - 46.4*Ich(t1) =L= 0 ; (\text{LHS} = 0)$$

$$\text{eq7}(t2).. Ec(t2) - 46.4*Ich(t2) =L= 0 ; (\text{LHS} = 0)$$

$$\text{eq7}(t3).. Ec(t3) - 46.4*Ich(t3) =L= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq8 =L=

$$\text{eq8}(t1).. Idch(t1) + Ich(t1) =L= 1 ; (\text{LHS} = 0)$$

$$\text{eq8}(t2).. Idch(t2) + Ich(t2) =L= 1 ; (\text{LHS} = 0)$$

$$\text{eq8}(t3).. Idch(t3) + Ich(t3) =L= 1 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq9 =E=

$$\text{eq9}(t1).. 0.915*G2(t1) - H1(t1) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq9}(t2).. 0.915*G2(t2) - H1(t2) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq9}(t3).. 0.915*G2(t3) - H1(t3) =E= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq10 =E=

$$\text{eq10}(t1).. G(t1) - G1(t1) - G2(t1) - G3(t1) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq10}(t2).. G(t2) - G1(t2) - G2(t2) - G3(t2) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq10}(t3).. G(t3) - G1(t3) - G2(t3) - G3(t3) =E= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq11 =E=

$$\text{eq11}(t1).. G3(t1) =E= 21.72 ; (\text{LHS} = 0, \text{INFES} = 21.72 \text{ ****})$$

$$\text{eq11}(t2).. G3(t2) =E= 21.72 ; (\text{LHS} = 0, \text{INFES} = 21.72 \text{ ****})$$

$$\text{eq11}(t3).. G3(t3) =E= 21.72 ; (\text{LHS} = 0, \text{INFES} = 21.72 \text{ ****})$$

REMAINING 21 ENTRIES SKIPPED

---- eq12 =E=

$$\text{eq12}(t1).. 0.527*G1(t1) + H1(t1) + H2(t1) + H\_ehp(t1) =E= 422.47 ; (\text{LHS} = 0, \text{INFES} = 422.47 \text{ ****})$$

$$\text{eq12}(t2).. 0.527*G1(t2) + H1(t2) + H2(t2) + H\_ehp(t2) =E= 422.47 ; (\text{LHS} = 0, \text{INFES} = 422.47 \text{ ****})$$

$$\text{eq12}(t3).. 0.527*G1(t3) + H1(t3) + H2(t3) + H\_ehp(t3) =E= 422.47 ; (\text{LHS} = 0, \text{INFES} = 422.47 \text{ ****})$$

REMAINING 21 ENTRIES SKIPPED

---- eq13 =E=

$$\text{eq13}(t1).. - H2(t1) + 0.9*DH(t1) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq13}(t2).. - H2(t2) + 0.9*DH(t2) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq13}(t3).. - H2(t3) + 0.9*DH(t3) =E= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq14 =E=

$$\text{eq14}(t1).. - 2.47*E3(t1) + H\_ehp(t1) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq14}(t2).. - 2.47*E3(t2) + H\_ehp(t2) =E= 0 ; (\text{LHS} = 0)$$

$$\text{eq14}(t3).. - 2.47*E3(t3) + H\_ehp(t3) =E= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq15 =L=

$$\text{eq15}(t1).. H\_ehp(t1) - 250*lh(t1) =L= 0 ; (\text{LHS} = 0)$$

$$\text{eq15}(t2).. H\_ehp(t2) - 250*lh(t2) =L= 0 ; (\text{LHS} = 0)$$

$$\text{eq15}(t3).. H\_ehp(t3) - 250*lh(t3) =L= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq16 =G=

$$\text{eq16}(t1).. H\_ehp(t1) - 75*lh(t1) =G= 0 ; (\text{LHS} = 0)$$

$$\text{eq16}(t2).. H\_ehp(t2) - 75*lh(t2) =G= 0 ; (\text{LHS} = 0)$$

$$\text{eq16}(t3).. H\_ehp(t3) - 75*lh(t3) =G= 0 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

---- eq17 =L=

$$\text{eq17}(t1).. lh(t1) =L= 1 ; (\text{LHS} = 0)$$

$$\text{eq17}(t2).. lh(t2) =L= 1 ; (\text{LHS} = 0)$$

$$\text{eq17}(t3).. lh(t3) =L= 1 ; (\text{LHS} = 0)$$

REMAINING 21 ENTRIES SKIPPED

General Algebraic Modeling System  
Column Listing SOLVE hub Using MIP From line 95

---- cost

cost

(.LO, .L, .UP, .M = -INF, 0, +INF, 0)  
1 eq1

---- E

E(t1)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
-2.027 eq1  
0.96 eq3(t1)

E(t2)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
-2.027 eq1  
0.96 eq3(t2)

E(t3)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
-2.027 eq1  
0.96 eq3(t3)

REMAINING 21 ENTRIES SKIPPED

---- E1

E1(t1)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
-1 eq3(t1)  
1 eq4(t1)

E1(t2)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
-1 eq3(t2)  
1 eq4(t2)

E1(t3)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
-1 eq3(t3)  
1 eq4(t3)

REMAINING 21 ENTRIES SKIPPED

---- E2

E2(t1)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
1 eq2(t1)  
-1 eq3(t1)



E2(t2)  
          (.LO, .L, .UP, .M = 0, 0, +INF, 0)  
      1    eq2(t2)  
     -1    eq3(t2)

E2(t3)  
          (.LO, .L, .UP, .M = 0, 0, +INF, 0)  
      1    eq2(t3)  
     -1    eq3(t3)

REMAINING 21 ENTRIES SKIPPED

---- E3

E3(t1)  
          (.LO, .L, .UP, .M = 0, 0, +INF, 0)  
     -1    eq2(t1)  
     -2.47  eq14(t1)

E3(t2)  
          (.LO, .L, .UP, .M = 0, 0, +INF, 0)  
     -1    eq2(t2)  
     -2.47  eq14(t2)

E3(t3)  
          (.LO, .L, .UP, .M = 0, 0, +INF, 0)  
     -1    eq2(t3)  
     -2.47  eq14(t3)

REMAINING 21 ENTRIES SKIPPED

---- G

G(t1)  
          (.LO, .L, .UP, .M = 0, 0, +INF, 0)  
     -1.763  eq1  
      1      eq10(t1)

G(t2)  
          (.LO, .L, .UP, .M = 0, 0, +INF, 0)  
     -1.763  eq1  
      1      eq10(t2)

G(t3)  
          (.LO, .L, .UP, .M = 0, 0, +INF, 0)  
     -1.763  eq1  
      1      eq10(t3)

REMAINING 21 ENTRIES SKIPPED

---- G1

G1(t1)  
          (.LO, .L, .UP, .M = 0, 0, 519, 0)  
      0.397  eq2(t1)  
     -1      eq10(t1)

0.527 eq12(t1)

G1(t2)

(.LO, .L, .UP, .M = 0, 0, 519, 0)

0.397 eq2(t2)

-1 eq10(t2)

0.527 eq12(t2)

G1(t3)

(.LO, .L, .UP, .M = 0, 0, 519, 0)

0.397 eq2(t3)

-1 eq10(t3)

0.527 eq12(t3)

REMAINING 21 ENTRIES SKIPPED

---- G2

G2(t1)

(.LO, .L, .UP, .M = 0, 0, 512, 0)

0.915 eq9(t1)

-1 eq10(t1)

G2(t2)

(.LO, .L, .UP, .M = 0, 0, 512, 0)

0.915 eq9(t2)

-1 eq10(t2)

G2(t3)

(.LO, .L, .UP, .M = 0, 0, 512, 0)

0.915 eq9(t3)

-1 eq10(t3)

REMAINING 21 ENTRIES SKIPPED

---- Ed

Ed(t1)

(.LO, .L, .UP, .M = 0, 0, 130, 0)

1 eq2(t1)

1.1111 eq5(t1)

1 eq6(t1)

Ed(t2)

(.LO, .L, .UP, .M = 0, 0, 130, 0)

1 eq2(t2)

1.1111 eq5(t2)

1 eq6(t2)

Ed(t3)

(.LO, .L, .UP, .M = 0, 0, 130, 0)

1 eq2(t3)

1.1111 eq5(t3)

1 eq6(t3)

REMAINING 21 ENTRIES SKIPPED

---- Ec

Ec(t1)

(.LO, .L, .UP, .M = 0, 0, 20, 0)

-1 eq4(t1)

-0.9 eq5(t1)

1 eq7(t1)

Ec(t2)

(.LO, .L, .UP, .M = 0, 0, 20, 0)

-1 eq4(t2)

-0.9 eq5(t2)

1 eq7(t2)

Ec(t3)

(.LO, .L, .UP, .M = 0, 0, 20, 0)

-1 eq4(t3)

-0.9 eq5(t3)

1 eq7(t3)

REMAINING 21 ENTRIES SKIPPED

---- H1

H1(t1)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

-1 eq9(t1)

1 eq12(t1)

H1(t2)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

-1 eq9(t2)

1 eq12(t2)

H1(t3)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

-1 eq9(t3)

1 eq12(t3)

REMAINING 21 ENTRIES SKIPPED

---- H2

H2(t1)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

1 eq12(t1)

-1 eq13(t1)

H2(t2)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

1 eq12(t2)

-1 eq13(t2)

H2(t3)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

1 eq12(t3)

-1 eq13(t3)

REMAINING 21 ENTRIES SKIPPED

---- H\_ehp

H\_ehp(t1)

(.LO, .L, .UP, .M = 0, 0, 250, 0)  
1 eq12(t1)  
1 eq14(t1)  
1 eq15(t1)  
1 eq16(t1)

H\_ehp(t2)

(.LO, .L, .UP, .M = 0, 0, 250, 0)  
1 eq12(t2)  
1 eq14(t2)  
1 eq15(t2)  
1 eq16(t2)

H\_ehp(t3)

(.LO, .L, .UP, .M = 0, 0, 250, 0)  
1 eq12(t3)  
1 eq14(t3)  
1 eq15(t3)  
1 eq16(t3)

REMAINING 21 ENTRIES SKIPPED

---- SOC

SOC(t1)

(.LO, .L, .UP, .M = 0, 0, 232, 0)  
1 eq5(t1)  
-1 eq5(t2)

SOC(t2)

(.LO, .L, .UP, .M = 0, 0, 232, 0)  
1 eq5(t2)  
-1 eq5(t3)

SOC(t3)

(.LO, .L, .UP, .M = 0, 0, 232, 0)  
1 eq5(t3)  
-1 eq5(t4)

REMAINING 21 ENTRIES SKIPPED

---- DH

DH(t1)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
-2.4 eq1  
0.9 eq13(t1)

DH(t2)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)  
-2.4 eq1

0.9 eq13(t2)

DH(t3)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

-2.4 eq1

0.9 eq13(t3)

REMAINING 21 ENTRIES SKIPPED

---- G3

G3(t1)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

-1 eq10(t1)

1 eq11(t1)

G3(t2)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

-1 eq10(t2)

1 eq11(t2)

G3(t3)

(.LO, .L, .UP, .M = 0, 0, +INF, 0)

-1 eq10(t3)

1 eq11(t3)

REMAINING 21 ENTRIES SKIPPED

---- lh

lh(t1)

(.LO, .L, .UP, .M = 0, 0, 1, 0)

-250 eq15(t1)

-75 eq16(t1)

1 eq17(t1)

lh(t2)

(.LO, .L, .UP, .M = 0, 0, 1, 0)

-250 eq15(t2)

-75 eq16(t2)

1 eq17(t2)

lh(t3)

(.LO, .L, .UP, .M = 0, 0, 1, 0)

-250 eq15(t3)

-75 eq16(t3)

1 eq17(t3)

REMAINING 21 ENTRIES SKIPPED

---- ldch

ldch(t1)

(.LO, .L, .UP, .M = 0, 0, 1, 0)

-46.4 eq6(t1)

1 eq8(t1)

ldch(t2)  
    (.LO, .L, .UP, .M = 0, 0, 1, 0)  
-46.4 eq6(t2)  
    1 eq8(t2)

ldch(t3)  
    (.LO, .L, .UP, .M = 0, 0, 1, 0)  
-46.4 eq6(t3)  
    1 eq8(t3)

REMAINING 21 ENTRIES SKIPPED

---- lch

lch(t1)  
    (.LO, .L, .UP, .M = 0, 0, 1, 0)  
-46.4 eq7(t1)  
    1 eq8(t1)

lch(t2)  
    (.LO, .L, .UP, .M = 0, 0, 1, 0)  
-46.4 eq7(t2)  
    1 eq8(t2)

lch(t3)  
    (.LO, .L, .UP, .M = 0, 0, 1, 0)  
-46.4 eq7(t3)  
    1 eq8(t3)

REMAINING 21 ENTRIES SKIPPED

General Algebraic Modeling System  
Model Statistics SOLVE hub Using MIP From line 95

MODEL STATISTICS

BLOCKS OF EQUATIONS	17	SINGLE EQUATIONS	385
BLOCKS OF VARIABLES	19	SINGLE VARIABLES	433
NON ZERO ELEMENTS	1,008	DISCRETE VARIABLES	72

GENERATION TIME = 0.062 SECONDS 4 MB 30.3.0 rc5da09e WEX-WEI

EXECUTION TIME = 0.062 SECONDS 4 MB 30.3.0 rc5da09e WEX-WEI

General Algebraic Modeling System  
 Solution Report SOLVE hub Using MIP From line 95

SOLVE SUMMARY

MODEL hub            OBJECTIVE cost  
 TYPE MIP            DIRECTION MINIMIZE  
 SOLVER CPLEX        FROM LINE 95

\*\*\*\* SOLVER STATUS    1 Normal Completion  
 \*\*\*\* MODEL STATUS    1 Optimal  
 \*\*\*\* OBJECTIVE VALUE    17708.9232

RESOURCE USAGE, LIMIT    0.047    1000.000  
 ITERATION COUNT, LIMIT    108    2000000000

IBM ILOG CPLEX 30.3.0 rc5da09e Released Mar 06, 2020 WEI x86 64bit/MS Window

\*\*\* This solver runs with a demo license. No commercial use.

Cplex 12.10.0.0

Space for names approximately 0.01 Mb  
 Use option 'names no' to turn use of names off  
 MIP status(101): integer optimal solution  
 Cplex Time: 0.01sec (det. 1.89 ticks)  
 Fixing integer variables, and solving final LP...  
 Fixed MIP status(1): optimal  
 Cplex Time: 0.00sec (det. 0.56 ticks)  
 Proven optimal solution.

MIP Solution:    17708.923223    (53 iterations, 0 nodes)  
 Final Solve:    17708.923223    (55 iterations)

Best possible:    17708.923223  
 Absolute gap:    0.000000  
 Relative gap:    0.000000

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU eq1	.	.	.	1.0000

---- EQU eq2

	LOWER	LEVEL	UPPER	MARGINAL
t1	53.9200	53.9200	53.9200	2.1115
t2	47.6600	47.6600	47.6600	2.1115
t3	42.3300	42.3300	42.3300	2.1115
t4	43.7700	43.7700	43.7700	2.1115
t5	48.4100	48.4100	48.4100	2.1115
t6	53.9700	53.9700	53.9700	2.1115
t7	69.2900	69.2900	69.2900	2.1115
t8	82.1000	82.1000	82.1000	2.1115
t9	89.9700	89.9700	89.9700	2.1115



t10	90.9200	90.9200	90.9200	2.1115
t11	95.0600	95.0600	95.0600	2.1115
t12	99.6000	99.6000	99.6000	2.7635
t13	96.0300	96.0300	96.0300	2.6067
t14	87.7900	87.7900	87.7900	2.6067
t15	93.6800	93.6800	93.6800	2.1115
t16	102.6500	102.6500	102.6500	2.1115
t17	123.6000	123.6000	123.6000	2.1115
t18	147.7800	147.7800	147.7800	2.1115
t19	150.8600	150.8600	150.8600	2.7635
t20	149.1800	149.1800	149.1800	2.7635
t21	138.4800	138.4800	138.4800	2.7635
t22	119.3300	119.3300	119.3300	2.7635
t23	94.1800	94.1800	94.1800	2.7635
t24	70.7900	70.7900	70.7900	2.1115

---- EQU eq3

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	.	2.1115
t2	.	.	.	2.1115
t3	.	.	.	2.1115
t4	.	.	.	2.1115
t5	.	.	.	2.1115
t6	.	.	.	2.1115
t7	.	.	.	2.1115
t8	.	.	.	2.1115
t9	-14.8600	-14.8600	-14.8600	2.1115
t10	-27.0400	-27.0400	-27.0400	2.1115
t11	-37.7000	-37.7000	-37.7000	2.1115
t12	-24.1100	-24.1100	-24.1100	2.7635
t13	-62.1400	-62.1400	-62.1400	2.6067
t14	-56.0100	-56.0100	-56.0100	2.6067
t15	-43.1800	-43.1800	-43.1800	2.1115
t16	.	.	.	2.1115
t17	.	.	.	2.1115
t18	.	.	.	2.1115
t19	.	.	.	2.7635
t20	.	.	.	2.7635
t21	.	.	.	2.7635
t22	.	.	.	2.7635
t23	.	.	.	2.7635
t24	.	.	.	2.1115

---- EQU eq4

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	.	2.1115
t2	.	.	.	2.1115
t3	.	.	.	2.1115
t4	.	.	.	2.1115
t5	.	.	.	2.1115
t6	.	.	.	2.1115
t7	.	.	.	2.1115
t8	.	.	.	2.1115

t9	.	.	.	2.1115
t10	.	.	.	2.1115
t11	.	.	.	2.1115
t12	.	.	.	.
t13	.	.	.	.
t14	.	.	.	.
t15	.	.	.	2.1115
t16	.	.	.	2.1115
t17	.	.	.	2.1115
t18	.	.	.	2.1115
t19	.	.	.	.
t20	.	.	.	.
t21	.	.	.	2.7635
t22	.	.	.	.
t23	.	.	.	.
t24	.	.	.	2.1115

---- EQU eq5

	LOWER	LEVEL	UPPER	MARGINAL
t1	46.4000	46.4000	46.4000	-2.3461
t2	.	.	.	-2.3461
t3	.	.	.	-2.3461
t4	.	.	.	-2.3461
t5	.	.	.	-2.3461
t6	.	.	.	-2.3461
t7	.	.	.	-2.3461
t8	.	.	.	-2.3461
t9	.	.	.	-2.3461
t10	.	.	.	-2.3461
t11	.	.	.	-2.3461
t12	.	.	.	-2.3461
t13	.	.	.	-2.3461
t14	.	.	.	-2.3461
t15	.	.	.	-2.3461
t16	.	.	.	-2.3461
t17	.	.	.	-2.3461
t18	.	.	.	-2.3461
t19	.	.	.	-2.4872
t20	.	.	.	-2.4872
t21	.	.	.	-2.4872
t22	.	.	.	-2.4872
t23	.	.	.	-2.4872
t24	.	.	.	-2.4872

---- EQU eq6

	LOWER	LEVEL	UPPER	MARGINAL
t1	-INF	.	.	.
t2	-INF	.	.	.
t3	-INF	.	.	.
t4	-INF	.	.	.
t5	-INF	.	.	.
t6	-INF	.	.	.
t7	-INF	.	.	.

t8	-INF	.	.	.
t9	-INF	.	.	.
t10	-INF	.	.	.
t11	-INF	.	.	.
t12	-INF	.	.	-0.1568
t13	-INF	-41.2206	.	.
t14	-INF	-43.3306	.	.
t15	-INF	.	.	.
t16	-INF	.	.	.
t17	-INF	.	.	.
t18	-INF	.	.	.
t19	-INF	-2.3600	.	.
t20	-INF	.	.	-4.44089E-16
t21	-INF	.	.	.
t22	-INF	.	.	-4.44089E-16
t23	-INF	.	.	-4.44089E-16
t24	-INF	.	.	.

---- EQU eq7

	LOWER	LEVEL	UPPER	MARGINAL
t1	-INF	-40.1778	.	.
t2	-INF	-26.4000	.	.
t3	-INF	-26.4000	.	.
t4	-INF	-26.4000	.	.
t5	-INF	-26.4000	.	.
t6	-INF	-26.4000	.	.
t7	-INF	-26.4000	.	.
t8	-INF	-26.4000	.	.
t9	-INF	-26.4000	.	.
t10	-INF	-26.4000	.	.
t11	-INF	-26.4000	.	.
t12	-INF	.	.	-2.1115
t13	-INF	.	.	-2.1115
t14	-INF	.	.	-2.1115
t15	-INF	-26.4000	.	.
t16	-INF	-38.9325	.	.
t17	-INF	-26.4000	.	.
t18	-INF	-26.4000	.	.
t19	-INF	.	.	-2.2385
t20	-INF	.	.	-2.2385
t21	-INF	-46.4000	.	.
t22	-INF	.	.	-2.2385
t23	-INF	.	.	-2.2385
t24	-INF	-26.4000	.	.

---- EQU eq8

	LOWER	LEVEL	UPPER	MARGINAL
t1	-INF	1.0000	1.0000	.
t2	-INF	1.0000	1.0000	.
t3	-INF	1.0000	1.0000	.
t4	-INF	1.0000	1.0000	.
t5	-INF	1.0000	1.0000	.
t6	-INF	1.0000	1.0000	.

t7	-INF	1.0000	1.0000	.
t8	-INF	1.0000	1.0000	.
t9	-INF	1.0000	1.0000	.
t10	-INF	1.0000	1.0000	.
t11	-INF	1.0000	1.0000	.
t12	-INF	1.0000	1.0000	.
t13	-INF	1.0000	1.0000	.
t14	-INF	1.0000	1.0000	.
t15	-INF	1.0000	1.0000	.
t16	-INF	1.0000	1.0000	.
t17	-INF	1.0000	1.0000	.
t18	-INF	1.0000	1.0000	.
t19	-INF	1.0000	1.0000	.
t20	-INF	1.0000	1.0000	.
t21	-INF	1.0000	1.0000	.
t22	-INF	1.0000	1.0000	.
t23	-INF	1.0000	1.0000	.
t24	-INF	1.0000	1.0000	.

---- EQU eq9

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	1.9268	.
t2	.	.	1.9268	.
t3	.	.	1.9268	.
t4	.	.	1.9268	.
t5	.	.	1.9268	.
t6	.	.	1.9268	.
t7	.	.	1.9268	.
t8	.	.	1.9268	.
t9	.	.	1.9268	.
t10	.	.	1.9268	.
t11	.	.	1.9268	.
t12	.	.	1.9268	.
t13	.	.	1.9268	.
t14	.	.	1.9268	.
t15	.	.	1.9268	.
t16	.	.	1.9268	.
t17	.	.	1.9268	.
t18	.	.	1.9268	.
t19	.	.	1.9268	.
t20	.	.	1.9268	.
t21	.	.	1.9268	.
t22	.	.	1.9268	.
t23	.	.	1.9268	.
t24	.	.	1.9268	.

---- EQU eq10

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	1.7630	.
t2	.	.	1.7630	.
t3	.	.	1.7630	.
t4	.	.	1.7630	.
t5	.	.	1.7630	.

t6	.	.	.	1.7630
t7	.	.	.	1.7630
t8	.	.	.	1.7630
t9	.	.	.	1.7630
t10	.	.	.	1.7630
t11	.	.	.	1.7630
t12	.	.	.	1.7630
t13	.	.	.	1.7630
t14	.	.	.	1.7630
t15	.	.	.	1.7630
t16	.	.	.	1.7630
t17	.	.	.	1.7630
t18	.	.	.	1.7630
t19	.	.	.	1.7630
t20	.	.	.	1.7630
t21	.	.	.	1.7630
t22	.	.	.	1.7630
t23	.	.	.	1.7630
t24	.	.	.	1.7630

---- EQU eq11

	LOWER	LEVEL	UPPER	MARGINAL
t1	21.7200	21.7200	21.7200	1.7630
t2	21.7200	21.7200	21.7200	1.7630
t3	21.7200	21.7200	21.7200	1.7630
t4	21.7200	21.7200	21.7200	1.7630
t5	21.7200	21.7200	21.7200	1.7630
t6	21.7200	21.7200	21.7200	1.7630
t7	21.7200	21.7200	21.7200	1.7630
t8	21.7200	21.7200	21.7200	1.7630
t9	21.7200	21.7200	21.7200	1.7630
t10	21.7200	21.7200	21.7200	1.7630
t11	21.7200	21.7200	21.7200	1.7630
t12	21.7200	21.7200	21.7200	1.7630
t13	21.7200	21.7200	21.7200	1.7630
t14	21.7200	21.7200	21.7200	1.7630
t15	21.7200	21.7200	21.7200	1.7630
t16	21.7200	21.7200	21.7200	1.7630
t17	21.7200	21.7200	21.7200	1.7630
t18	21.7200	21.7200	21.7200	1.7630
t19	21.7200	21.7200	21.7200	1.7630
t20	21.7200	21.7200	21.7200	1.7630
t21	21.7200	21.7200	21.7200	1.7630
t22	21.7200	21.7200	21.7200	1.7630
t23	21.7200	21.7200	21.7200	1.7630
t24	21.7200	21.7200	21.7200	1.7630

---- EQU eq12

	LOWER	LEVEL	UPPER	MARGINAL
t1	422.4700	422.4700	422.4700	1.7547
t2	422.4700	422.4700	422.4700	1.7547
t3	422.4700	422.4700	422.4700	1.7547
t4	422.4700	422.4700	422.4700	1.7547

t5	422.4700	422.4700	422.4700	1.7547
t6	422.4700	422.4700	422.4700	1.7547
t7	422.4700	422.4700	422.4700	1.7547
t8	422.4700	422.4700	422.4700	1.7547
t9	422.4700	422.4700	422.4700	1.7547
t10	422.4700	422.4700	422.4700	1.7547
t11	422.4700	422.4700	422.4700	1.7547
t12	422.4700	422.4700	422.4700	1.2635
t13	422.4700	422.4700	422.4700	1.3816
t14	422.4700	422.4700	422.4700	1.3816
t15	422.4700	422.4700	422.4700	1.7547
t16	422.4700	422.4700	422.4700	1.7547
t17	422.4700	422.4700	422.4700	1.7547
t18	422.4700	422.4700	422.4700	1.7547
t19	422.4700	422.4700	422.4700	1.2635
t20	422.4700	422.4700	422.4700	1.2635
t21	422.4700	422.4700	422.4700	1.2635
t22	422.4700	422.4700	422.4700	1.2635
t23	422.4700	422.4700	422.4700	1.2635
t24	422.4700	422.4700	422.4700	1.7547

---- EQU eq13

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	.	2.6667
t2	.	.	.	2.6667
t3	.	.	.	2.6667
t4	.	.	.	2.6667
t5	.	.	.	2.6667
t6	.	.	.	2.6667
t7	.	.	.	2.6667
t8	.	.	.	2.6667
t9	.	.	.	2.6667
t10	.	.	.	2.6667
t11	.	.	.	2.6667
t12	.	.	.	2.6667
t13	.	.	.	2.6667
t14	.	.	.	2.6667
t15	.	.	.	2.6667
t16	.	.	.	2.6667
t17	.	.	.	2.6667
t18	.	.	.	2.6667
t19	.	.	.	2.6667
t20	.	.	.	2.6667
t21	.	.	.	2.6667
t22	.	.	.	2.6667
t23	.	.	.	2.6667
t24	.	.	.	2.6667

---- EQU eq14

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	.	-0.8548
t2	.	.	.	-0.8548
t3	.	.	.	-0.8548

t4	.	.	.	-0.8548
t5	.	.	.	-0.8548
t6	.	.	.	-0.8548
t7	.	.	.	-0.8548
t8	.	.	.	-0.8548
t9	.	.	.	-0.8548
t10	.	.	.	-0.8548
t11	.	.	.	-0.8548
t12	.	.	.	-1.1188
t13	.	.	.	-1.0554
t14	.	.	.	-1.0554
t15	.	.	.	-0.8548
t16	.	.	.	-0.8548
t17	.	.	.	-0.8548
t18	.	.	.	-0.8548
t19	.	.	.	-1.1188
t20	.	.	.	-1.1188
t21	.	.	.	-1.1188
t22	.	.	.	-1.1188
t23	.	.	.	-1.1188
t24	.	.	.	-0.8548

---- EQU eq15

	LOWER	LEVEL	UPPER	MARGINAL
t1	-INF	.	.	.
t2	-INF	.	.	.
t3	-INF	.	.	.
t4	-INF	.	.	.
t5	-INF	.	.	.
t6	-INF	.	.	.
t7	-INF	.	.	.
t8	-INF	.	.	.
t9	-INF	.	.	.
t10	-INF	.	.	.
t11	-INF	.	.	.
t12	-INF	.	.	.
t13	-INF	.	.	.
t14	-INF	.	.	.
t15	-INF	.	.	.
t16	-INF	.	.	.
t17	-INF	.	.	.
t18	-INF	.	.	.
t19	-INF	.	.	.
t20	-INF	.	.	.
t21	-INF	.	.	.
t22	-INF	.	.	.
t23	-INF	.	.	.
t24	-INF	.	.	.

---- EQU eq16

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	175.0000	+INF	.
t2	.	175.0000	+INF	.

t3	.	175.0000	+INF	.
t4	.	175.0000	+INF	.
t5	.	175.0000	+INF	.
t6	.	175.0000	+INF	.
t7	.	175.0000	+INF	.
t8	.	175.0000	+INF	.
t9	.	175.0000	+INF	.
t10	.	175.0000	+INF	.
t11	.	175.0000	+INF	.
t12	.	175.0000	+INF	.
t13	.	175.0000	+INF	.
t14	.	175.0000	+INF	.
t15	.	175.0000	+INF	.
t16	.	175.0000	+INF	.
t17	.	175.0000	+INF	.
t18	.	175.0000	+INF	.
t19	.	175.0000	+INF	.
t20	.	175.0000	+INF	.
t21	.	175.0000	+INF	.
t22	.	175.0000	+INF	.
t23	.	175.0000	+INF	.
t24	.	175.0000	+INF	.

---- EQU eq17

	LOWER	LEVEL	UPPER	MARGINAL
t1	-INF	1.0000	1.0000	.
t2	-INF	1.0000	1.0000	.
t3	-INF	1.0000	1.0000	.
t4	-INF	1.0000	1.0000	.
t5	-INF	1.0000	1.0000	.
t6	-INF	1.0000	1.0000	.
t7	-INF	1.0000	1.0000	.
t8	-INF	1.0000	1.0000	.
t9	-INF	1.0000	1.0000	.
t10	-INF	1.0000	1.0000	.
t11	-INF	1.0000	1.0000	.
t12	-INF	1.0000	1.0000	.
t13	-INF	1.0000	1.0000	.
t14	-INF	1.0000	1.0000	.
t15	-INF	1.0000	1.0000	.
t16	-INF	1.0000	1.0000	.
t17	-INF	1.0000	1.0000	.
t18	-INF	1.0000	1.0000	.
t19	-INF	1.0000	1.0000	.
t20	-INF	1.0000	1.0000	.
t21	-INF	1.0000	1.0000	.
t22	-INF	1.0000	1.0000	.
t23	-INF	1.0000	1.0000	.
t24	-INF	1.0000	1.0000	.

	LOWER	LEVEL	UPPER	MARGINAL
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---- VAR cost	-INF	17708.9232	+INF	.
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---- VAR E



	LOWER	LEVEL	UPPER	MARGINAL
t1	.	32.7412	+INF	.
t2	.	40.5722	+INF	.
t3	.	35.0202	+INF	.
t4	.	36.5202	+INF	.
t5	.	41.3535	+INF	.
t6	.	47.1452	+INF	.
t7	.	63.1035	+INF	.
t8	.	76.4472	+INF	.
t9	.	69.1660	+INF	.
t10	.	57.4681	+INF	.
t11	.	50.6764	+INF	.
t12	.	0.3952	+INF	.
t13	.	.	+INF	0.1505
t14	.	.	+INF	0.1505
t15	.	43.5306	+INF	.
t16	.	84.7989	+INF	.
t17	.	119.6764	+INF	.
t18	.	144.8639	+INF	.
t19	.	81.3639	+INF	.
t20	.	77.1556	+INF	.
t21	.	114.3431	+INF	.
t22	.	46.0618	+INF	.
t23	.	19.8639	+INF	.
t24	.	64.6660	+INF	.

---- VAR E1

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	6.2222	+INF	.
t2	.	20.0000	+INF	.
t3	.	20.0000	+INF	.
t4	.	20.0000	+INF	.
t5	.	20.0000	+INF	.
t6	.	20.0000	+INF	.
t7	.	20.0000	+INF	.
t8	.	20.0000	+INF	.
t9	.	20.0000	+INF	.
t10	.	20.0000	+INF	.
t11	.	20.0000	+INF	.
t12	.	.	+INF	2.7635
t13	.	.	+INF	2.6067
t14	.	.	+INF	2.6067
t15	.	20.0000	+INF	.
t16	.	7.4675	+INF	.
t17	.	20.0000	+INF	.
t18	.	20.0000	+INF	.
t19	.	.	+INF	2.7635
t20	.	.	+INF	2.7635
t21	.	.	+INF	.
t22	.	.	+INF	2.7635
t23	.	.	+INF	2.7635
t24	.	20.0000	+INF	.

---- VAR E2

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	25.2094	+INF	.
t2	.	18.9494	+INF	.
t3	.	13.6194	+INF	.
t4	.	15.0594	+INF	.
t5	.	19.6994	+INF	.
t6	.	25.2594	+INF	.
t7	.	40.5794	+INF	.
t8	.	53.3894	+INF	.
t9	.	61.2594	+INF	.
t10	.	62.2094	+INF	.
t11	.	66.3494	+INF	.
t12	.	24.4894	+INF	.
t13	.	62.1400	+INF	.
t14	.	56.0100	+INF	.
t15	.	64.9694	+INF	.
t16	.	73.9394	+INF	.
t17	.	94.8894	+INF	.
t18	.	119.0694	+INF	.
t19	.	78.1094	+INF	.
t20	.	74.0694	+INF	.
t21	.	109.7694	+INF	.
t22	.	44.2194	+INF	.
t23	.	19.0694	+INF	.
t24	.	42.0794	+INF	.

---- VAR E3

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	101.2146	+INF	.
t2	.	101.2146	+INF	.
t3	.	101.2146	+INF	.
t4	.	101.2146	+INF	.
t5	.	101.2146	+INF	.
t6	.	101.2146	+INF	.
t7	.	101.2146	+INF	.
t8	.	101.2146	+INF	.
t9	.	101.2146	+INF	.
t10	.	101.2146	+INF	.
t11	.	101.2146	+INF	.
t12	.	101.2146	+INF	.
t13	.	101.2146	+INF	.
t14	.	101.2146	+INF	.
t15	.	101.2146	+INF	.
t16	.	101.2146	+INF	.
t17	.	101.2146	+INF	.
t18	.	101.2146	+INF	.
t19	.	101.2146	+INF	.
t20	.	101.2146	+INF	.
t21	.	101.2146	+INF	.
t22	.	101.2146	+INF	.
t23	.	101.2146	+INF	.
t24	.	101.2146	+INF	.

---- VAR G

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	348.9876	+INF	.
t2	.	348.9876	+INF	.
t3	.	348.9876	+INF	.
t4	.	348.9876	+INF	.
t5	.	348.9876	+INF	.
t6	.	348.9876	+INF	.
t7	.	348.9876	+INF	.
t8	.	348.9876	+INF	.
t9	.	348.9876	+INF	.
t10	.	348.9876	+INF	.
t11	.	348.9876	+INF	.
t12	.	348.9876	+INF	.
t13	.	348.9876	+INF	.
t14	.	348.9876	+INF	.
t15	.	348.9876	+INF	.
t16	.	348.9876	+INF	.
t17	.	348.9876	+INF	.
t18	.	348.9876	+INF	.
t19	.	348.9876	+INF	.
t20	.	348.9876	+INF	.
t21	.	348.9876	+INF	.
t22	.	348.9876	+INF	.
t23	.	348.9876	+INF	.
t24	.	348.9876	+INF	.

---- VAR G1

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	327.2676	519.0000	.
t2	.	327.2676	519.0000	.
t3	.	327.2676	519.0000	.
t4	.	327.2676	519.0000	.
t5	.	327.2676	519.0000	.
t6	.	327.2676	519.0000	.
t7	.	327.2676	519.0000	.
t8	.	327.2676	519.0000	.
t9	.	327.2676	519.0000	.
t10	.	327.2676	519.0000	.
t11	.	327.2676	519.0000	.
t12	.	327.2676	519.0000	.
t13	.	327.2676	519.0000	.
t14	.	327.2676	519.0000	.
t15	.	327.2676	519.0000	.
t16	.	327.2676	519.0000	.
t17	.	327.2676	519.0000	.
t18	.	327.2676	519.0000	.
t19	.	327.2676	519.0000	.
t20	.	327.2676	519.0000	.
t21	.	327.2676	519.0000	.
t22	.	327.2676	519.0000	.
t23	.	327.2676	519.0000	.

t24 . 327.2676 519.0000 .

---- VAR G2

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	512.0000	.
t2	.	.	512.0000	.
t3	.	.	512.0000	.
t4	.	.	512.0000	.
t5	.	.	512.0000	.
t6	.	.	512.0000	.
t7	.	.	512.0000	.
t8	.	.	512.0000	.
t9	.	.	512.0000	.
t10	.	.	512.0000	.
t11	.	.	512.0000	.
t12	.	.	512.0000	.
t13	.	.	512.0000	.
t14	.	.	512.0000	.
t15	.	.	512.0000	.
t16	.	.	512.0000	.
t17	.	.	512.0000	.
t18	.	.	512.0000	.
t19	.	.	512.0000	.
t20	.	.	512.0000	.
t21	.	.	512.0000	.
t22	.	.	512.0000	.
t23	.	.	512.0000	.
t24	.	.	512.0000	.

---- VAR Ed

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	130.0000	0.4953
t2	.	.	130.0000	0.4953
t3	.	.	130.0000	0.4953
t4	.	.	130.0000	0.4953
t5	.	.	130.0000	0.4953
t6	.	.	130.0000	0.4953
t7	.	.	130.0000	0.4953
t8	.	.	130.0000	0.4953
t9	.	.	130.0000	0.4953
t10	.	.	130.0000	0.4953
t11	.	.	130.0000	0.4953
t12	.	46.4000	130.0000	.
t13	.	5.1794	130.0000	.
t14	.	3.0694	130.0000	.
t15	.	.	130.0000	0.4953
t16	.	.	130.0000	0.4953
t17	.	.	130.0000	0.4953
t18	.	.	130.0000	0.4953
t19	.	44.0400	130.0000	.
t20	.	46.4000	130.0000	.
t21	.	.	130.0000	-4.44089E-16
t22	.	46.4000	130.0000	.

t23	.	46.4000	130.0000	.
t24	.	.	130.0000	0.6521

---- VAR Ec

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	6.2222	20.0000	.
t2	.	20.0000	20.0000	EPS
t3	.	20.0000	20.0000	EPS
t4	.	20.0000	20.0000	EPS
t5	.	20.0000	20.0000	EPS
t6	.	20.0000	20.0000	EPS
t7	.	20.0000	20.0000	EPS
t8	.	20.0000	20.0000	EPS
t9	.	20.0000	20.0000	EPS
t10	.	20.0000	20.0000	EPS
t11	.	20.0000	20.0000	EPS
t12	.	.	20.0000	.
t13	.	.	20.0000	.
t14	.	.	20.0000	.
t15	.	20.0000	20.0000	EPS
t16	.	7.4675	20.0000	.
t17	.	20.0000	20.0000	EPS
t18	.	20.0000	20.0000	EPS
t19	.	.	20.0000	.
t20	.	.	20.0000	.
t21	.	.	20.0000	0.5251
t22	.	.	20.0000	.
t23	.	.	20.0000	.
t24	.	20.0000	20.0000	-0.1270

---- VAR H1

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	+INF	0.1720
t2	.	.	+INF	0.1720
t3	.	.	+INF	0.1720
t4	.	.	+INF	0.1720
t5	.	.	+INF	0.1720
t6	.	.	+INF	0.1720
t7	.	.	+INF	0.1720
t8	.	.	+INF	0.1720
t9	.	.	+INF	0.1720
t10	.	.	+INF	0.1720
t11	.	.	+INF	0.1720
t12	.	.	+INF	0.6633
t13	.	.	+INF	0.5451
t14	.	.	+INF	0.5451
t15	.	.	+INF	0.1720
t16	.	.	+INF	0.1720
t17	.	.	+INF	0.1720
t18	.	.	+INF	0.1720
t19	.	.	+INF	0.6633
t20	.	.	+INF	0.6633
t21	.	.	+INF	0.6633

t22	.	.	+INF	0.6633
t23	.	.	+INF	0.6633
t24	.	.	+INF	0.1720

---- VAR H2

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	+INF	0.9119
t2	.	.	+INF	0.9119
t3	.	.	+INF	0.9119
t4	.	.	+INF	0.9119
t5	.	.	+INF	0.9119
t6	.	.	+INF	0.9119
t7	.	.	+INF	0.9119
t8	.	.	+INF	0.9119
t9	.	.	+INF	0.9119
t10	.	.	+INF	0.9119
t11	.	.	+INF	0.9119
t12	.	.	+INF	1.4031
t13	.	.	+INF	1.2850
t14	.	.	+INF	1.2850
t15	.	.	+INF	0.9119
t16	.	.	+INF	0.9119
t17	.	.	+INF	0.9119
t18	.	.	+INF	0.9119
t19	.	.	+INF	1.4031
t20	.	.	+INF	1.4031
t21	.	.	+INF	1.4031
t22	.	.	+INF	1.4031
t23	.	.	+INF	1.4031
t24	.	.	+INF	0.9119

---- VAR H\_ehp

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	250.0000	250.0000	-0.8999
t2	.	250.0000	250.0000	-0.8999
t3	.	250.0000	250.0000	-0.8999
t4	.	250.0000	250.0000	-0.8999
t5	.	250.0000	250.0000	-0.8999
t6	.	250.0000	250.0000	-0.8999
t7	.	250.0000	250.0000	-0.8999
t8	.	250.0000	250.0000	-0.8999
t9	.	250.0000	250.0000	-0.8999
t10	.	250.0000	250.0000	-0.8999
t11	.	250.0000	250.0000	-0.8999
t12	.	250.0000	250.0000	-0.1447
t13	.	250.0000	250.0000	-0.3263
t14	.	250.0000	250.0000	-0.3263
t15	.	250.0000	250.0000	-0.8999
t16	.	250.0000	250.0000	-0.8999
t17	.	250.0000	250.0000	-0.8999
t18	.	250.0000	250.0000	-0.8999
t19	.	250.0000	250.0000	-0.1447
t20	.	250.0000	250.0000	-0.1447

t21	.	250.0000	250.0000	-0.1447
t22	.	250.0000	250.0000	-0.1447
t23	.	250.0000	250.0000	-0.1447
t24	.	250.0000	250.0000	-0.8999

---- VAR SOC

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	52.0000	232.0000	.
t2	.	70.0000	232.0000	.
t3	.	88.0000	232.0000	.
t4	.	106.0000	232.0000	.
t5	.	124.0000	232.0000	.
t6	.	142.0000	232.0000	.
t7	.	160.0000	232.0000	.
t8	.	178.0000	232.0000	.
t9	.	196.0000	232.0000	.
t10	.	214.0000	232.0000	.
t11	.	232.0000	232.0000	EPS
t12	.	180.4444	232.0000	.
t13	.	174.6896	232.0000	.
t14	.	171.2792	232.0000	.
t15	.	189.2792	232.0000	.
t16	.	196.0000	232.0000	.
t17	.	214.0000	232.0000	.
t18	.	232.0000	232.0000	-0.1411
t19	.	183.0667	232.0000	.
t20	.	131.5111	232.0000	.
t21	.	131.5111	232.0000	.
t22	.	79.9556	232.0000	.
t23	.	28.4000	232.0000	.
t24	46.4000	46.4000	46.4000	2.4872

---- VAR DH

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	+INF	.
t2	.	.	+INF	.
t3	.	.	+INF	.
t4	.	.	+INF	.
t5	.	.	+INF	.
t6	.	.	+INF	.
t7	.	.	+INF	.
t8	.	.	+INF	.
t9	.	.	+INF	.
t10	.	.	+INF	.
t11	.	.	+INF	.
t12	.	.	+INF	.
t13	.	.	+INF	.
t14	.	.	+INF	.
t15	.	.	+INF	.
t16	.	.	+INF	.
t17	.	.	+INF	.
t18	.	.	+INF	.
t19	.	.	+INF	.

t20	.	.	+INF	.
t21	.	.	+INF	.
t22	.	.	+INF	.
t23	.	.	+INF	.
t24	.	.	+INF	.

---- VAR G3

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	21.7200	+INF	.
t2	.	21.7200	+INF	.
t3	.	21.7200	+INF	.
t4	.	21.7200	+INF	.
t5	.	21.7200	+INF	.
t6	.	21.7200	+INF	.
t7	.	21.7200	+INF	.
t8	.	21.7200	+INF	.
t9	.	21.7200	+INF	.
t10	.	21.7200	+INF	.
t11	.	21.7200	+INF	.
t12	.	21.7200	+INF	.
t13	.	21.7200	+INF	.
t14	.	21.7200	+INF	.
t15	.	21.7200	+INF	.
t16	.	21.7200	+INF	.
t17	.	21.7200	+INF	.
t18	.	21.7200	+INF	.
t19	.	21.7200	+INF	.
t20	.	21.7200	+INF	.
t21	.	21.7200	+INF	.
t22	.	21.7200	+INF	.
t23	.	21.7200	+INF	.
t24	.	21.7200	+INF	.

---- VAR lh

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	1.0000	1.0000	EPS
t2	.	1.0000	1.0000	EPS
t3	.	1.0000	1.0000	EPS
t4	.	1.0000	1.0000	EPS
t5	.	1.0000	1.0000	EPS
t6	.	1.0000	1.0000	EPS
t7	.	1.0000	1.0000	EPS
t8	.	1.0000	1.0000	EPS
t9	.	1.0000	1.0000	EPS
t10	.	1.0000	1.0000	EPS
t11	.	1.0000	1.0000	EPS
t12	.	1.0000	1.0000	EPS
t13	.	1.0000	1.0000	EPS
t14	.	1.0000	1.0000	EPS
t15	.	1.0000	1.0000	EPS
t16	.	1.0000	1.0000	EPS
t17	.	1.0000	1.0000	EPS
t18	.	1.0000	1.0000	EPS



t19	.	1.0000	1.0000	EPS
t20	.	1.0000	1.0000	EPS
t21	.	1.0000	1.0000	EPS
t22	.	1.0000	1.0000	EPS
t23	.	1.0000	1.0000	EPS
t24	.	1.0000	1.0000	EPS

---- VAR Idch

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	1.0000	EPS
t2	.	.	1.0000	EPS
t3	.	.	1.0000	EPS
t4	.	.	1.0000	EPS
t5	.	.	1.0000	EPS
t6	.	.	1.0000	EPS
t7	.	.	1.0000	EPS
t8	.	.	1.0000	EPS
t9	.	.	1.0000	EPS
t10	.	.	1.0000	EPS
t11	.	.	1.0000	EPS
t12	.	1.0000	1.0000	-7.2757
t13	.	1.0000	1.0000	EPS
t14	.	1.0000	1.0000	EPS
t15	.	.	1.0000	EPS
t16	.	.	1.0000	EPS
t17	.	.	1.0000	EPS
t18	.	.	1.0000	EPS
t19	.	1.0000	1.0000	EPS
t20	.	1.0000	1.0000	-2.06057E-14
t21	.	.	1.0000	EPS
t22	.	1.0000	1.0000	-2.06057E-14
t23	.	1.0000	1.0000	-2.06057E-14
t24	.	.	1.0000	EPS

---- VAR Ich

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	1.0000	1.0000	EPS
t2	.	1.0000	1.0000	EPS
t3	.	1.0000	1.0000	EPS
t4	.	1.0000	1.0000	EPS
t5	.	1.0000	1.0000	EPS
t6	.	1.0000	1.0000	EPS
t7	.	1.0000	1.0000	EPS
t8	.	1.0000	1.0000	EPS
t9	.	1.0000	1.0000	EPS
t10	.	1.0000	1.0000	EPS
t11	.	1.0000	1.0000	EPS
t12	.	.	1.0000	-97.9717
t13	.	.	1.0000	-97.9717
t14	.	.	1.0000	-97.9717
t15	.	1.0000	1.0000	EPS
t16	.	1.0000	1.0000	EPS
t17	.	1.0000	1.0000	EPS

t18	.	1.0000	1.0000	EPS
t19	.	.	1.0000	-103.8650
t20	.	.	1.0000	-103.8649
t21	.	1.0000	1.0000	EPS
t22	.	.	1.0000	-103.8649
t23	.	.	1.0000	-103.8649
t24	.	1.0000	1.0000	EPS

\*\*\*\* REPORT SUMMARY : 0 NONOPT  
0 INFEASIBLE  
0 UNBOUNDED



t24 64.666 129.925 20.000 348.988 327.268 21.720 172.470 250.000 20.000  
46.400

EXECUTION TIME = 0.000 SECONDS 3 MB 30.3.0 rc5da09e WEX-WEI

USER: GAMS Demo license for Josef Kuratko G200202|0002CO-GEN  
Czech Technical University in Prague, Czech Republic DL001166

\*\*\*\* FILE SUMMARY

Input D:\Dropbox\DP GAMS\GAMS\VARIANTA5.gms  
Output D:\Dropbox\DP GAMS\GAMS\VARIANTA5.lst