Appendix A : A Listing File of Model I

Given $B = 1,000,000$, $a_1 = 334(kbps)$, $a_2 = 166(kbps)$, $a_3 = 56(kbps)$, $r_1 = 167(kbps)$, $r_2 = 83(kbps)$, and $r_3 = 28(kbps)$ where $\delta_i = a_i/r_i = 2$, $\forall i = 1, 2, 3$. Just like in Table 4.2, three different QoS classes are given, where class 1 has the highest priority and class 3 has the lowest priority. We change the numbers of connections in class 1 to $(J_1, J_2, J_3) = (190, 100, 100)$, and the numerical results are shown in Table 4.3.

Following is the listing file of the program Model I.

```
G e n e r a l   A l g e b r a i c   M o d e l i n g   S y s t e m
C o m p i l a t i o n

*Model I*
options
MINLP=BARON,
SOLVEOPT=REPLACE,
DECIMALS=8;
*Model I*
*宣告集合的大小 *
*****************
SETS
i " index of class 1 to 3 in Model I " /1*3/,
e " index of link 1 to 14 in Model I " /1*14/;
*Model I*
*宣告參數*
**********
PARAMETERS
J(i) " Number of connection of class i  in Model I "
/
1        190
2        100
3        100
/,
capital_B " Total budget in Model I " /1000000/,
*m "a sufficiently large positive number"
*/1000000000000000000000000000000000/,
```

```
U(e) " Capacity of link e in Model I "
/
1        230000
2        350000
3        100000
4        250000
5        210000
6        220000
7        200000
8        300000
9        210000
10       270000
11       150000
12       180000
13       300000
14       350000

/,
small_k(e) " The link cost of bandwidth for each link e in Model I "
/
1        5
2        6
3        10
4        5
5        4
6        11
7        6
8        8
9        6
10        7
11        12
12        6
13        5
14        6

/,
l(e) " Mean delay in Model I "
/
1        0.03
2        0.032
3        0.035
4        0.012
5        0.02
6        0.012
7        0.03
8        0.015
9        0.027
10        0.012
11        0.03
12        0.02
13        0.035
14        0.035

/,
capital_D(i) " Maximal end-to-end delay in Model I "
/
1        0.89
2        1.02
3        2.34

```

```
/,
a(i) " Asp. Level in Model I "
/
1        334
2        166
3        56

/,
r(i) " Res. Level in Model I "
/
1        167
2        83
3        28

/,
s(i) " Mean Packet Size in Model I "
/
1        35
2        16.6
3        12.5

/,
b(i) " Bandwidth requirement of class i in Model I  "
/
1        160
2        80
3        25

/;

*Model I*

*變數限制*
**********
free variable Z " Total utilijation sum in Model I ";

positive variables q(i) " Bandwidth of each class i in Model I ";
positive variables w(i) " Weight of each class i in Model I ";

binary variables x(i,e) " Binary variables in Model I ";

*Model I*

*宣告限制式*
************
EQUATIONS
OBJ  " Maximizing total utilijation sum in Model I ",
budg " Sum of q(i)*x(i,e) is smaller then budget in Model I ",
capa(e) " Smaller then capacity in Model I ",
dela(i) " Smaller then delay in Model I ",
requ(i) " q(i) bigger then bandwidth requirement b(i) in Model I ",
sour(i) " Source sum is 1 in Model I ",
inout2(i) " in equal out in node 2 in Model I ",
inout3(i) " in equal out in node 3 in Model I ",
inout4(i) " in equal out in node 4 in Model I ",
inout5(i) " in equal out in node 5 in Model I ",
inout6(i) " in equal out in node 6 in Model I ",
dest(i) " Destination sum is 1 in Model I ",
weig " Sum of weight equal to 1 in Model I ";

*Model I*

*目標函數與限制式表示 *
```

```
163  ***********************
164
165  OBJ..
166  Z =e= SUM(i,w(i)*(log((q(i)+0.00001)/r(i)))/ (log(a(i)/r(i))));
167
168  budg..
169  SUM((i,e),J(i)*small_k(e)*q(i)*x(i,e))=l=capital_B;
170
171  capa(e)..
172  SUM(i,J(i)*q(i)*x(i,e))=l=U(e);
173
174  dela(i)..
175  SUM(e,l(e)*x(i,e))=l=capital_D(i);
176
177  requ(i)..
178  q(i)=g=b(i);
179
180  sour(i)..
181  x(i,'1')+x(i,'2')+x(i,'3')=e=1;
182
183  inout2(i)..
184  x(i,'1')=e= x(i,'4')+ x(i,'5')+ x(i,'6');
185
186  inout3(i)..
187  x(i,'2')+x(i,'4')=e= x(i,'7')+ x(i,'8');
188
189  inout4(i)..
190  x(i,'5')+ x(i,'3')+x(i,'7')=e= x(i,'9')+ x(i,'11')+x(i,'10');
191
192  inout5(i)..
193  x(i,'6')+ x(i,'9')+x(i,'12')=e= x(i,'13');
194
195  inout6(i)..
196  x(i,'10')+ x(i,'8')=e= x(i,'12')+ x(i,'14');
197
198  dest(i)..
199  x(i,'13')+x(i,'11')+x(i,'14')=e=1;
200
201  weig..
202  SUM(i,w(i))=e=1;
203
204  *Model I*
205
206  *宣告模型 *
207  ***********
208  MODEL Model_I  /ALL/;
209  SOLVE Model_I USING MINLP MAXIMIZING Z;
210
211  *Model I*
212
213  *結果呈現*
214  **********
215
216  display q.l;
217
218  *Model I*


COMPILATION TIME     =        0.000 SECONDS     3.2 Mb  WIN213-138 Feb 03, 2004


G e n e r a l   A l g e b r a i c   M o d e l i n g   S y s t e m
Equation Listing    SOLVE Model_I Using MINLP From line 209
```

```
---- OBJ  =E=   Maximizing total utilijation sum in Model I

OBJ..  Z + (0)*q(1) + (0)*q(2) + (0)*q(3) + (23.9933447669109)*w(1)

      + (22.9846799057837)*w(2) + (21.4169953964944)*w(3) =E= 0 ; (LHS = 0)


---- budg  =L=   Sum of q(i)*x(i,e) is smaller then budget in Model I

budg..  (0)*q(1) + (0)*q(2) + (0)*q(3) + (0)*x(1,1) + (0)*x(1,2) + (0)*x(1,3)

      + (0)*x(1,4) + (0)*x(1,5) + (0)*x(1,6) + (0)*x(1,7) + (0)*x(1,8)

      + (0)*x(1,9) + (0)*x(1,10) + (0)*x(1,11) + (0)*x(1,12) + (0)*x(1,13)

      + (0)*x(1,14) + (0)*x(2,1) + (0)*x(2,2) + (0)*x(2,3) + (0)*x(2,4)

      + (0)*x(2,5) + (0)*x(2,6) + (0)*x(2,7) + (0)*x(2,8) + (0)*x(2,9)

      + (0)*x(2,10) + (0)*x(2,11) + (0)*x(2,12) + (0)*x(2,13) + (0)*x(2,14)

      + (0)*x(3,1) + (0)*x(3,2) + (0)*x(3,3) + (0)*x(3,4) + (0)*x(3,5)

      + (0)*x(3,6) + (0)*x(3,7) + (0)*x(3,8) + (0)*x(3,9) + (0)*x(3,10)

      + (0)*x(3,11) + (0)*x(3,12) + (0)*x(3,13) + (0)*x(3,14) =L= 1000000 ;

      (LHS = 0)


---- capa  =L=   Smaller then capacity in Model I

capa(1)..  (0)*q(1) + (0)*q(2) + (0)*q(3) + (0)*x(1,1) + (0)*x(2,1) + (0)*x(3,1)
      =L= 230000 ; (LHS = 0)

capa(2)..  (0)*q(1) + (0)*q(2) + (0)*q(3) + (0)*x(1,2) + (0)*x(2,2) + (0)*x(3,2)
      =L= 350000 ; (LHS = 0)

capa(3)..  (0)*q(1) + (0)*q(2) + (0)*q(3) + (0)*x(1,3) + (0)*x(2,3) + (0)*x(3,3)
      =L= 100000 ; (LHS = 0)

REMAINING 11 ENTRIES SKIPPED


---- dela  =L=   Smaller then delay in Model I

dela(1)..  0.03*x(1,1) + 0.032*x(1,2) + 0.035*x(1,3) + 0.012*x(1,4)

      + 0.02*x(1,5) + 0.012*x(1,6) + 0.03*x(1,7) + 0.015*x(1,8) + 0.027*x(1,9)

      + 0.012*x(1,10) + 0.03*x(1,11) + 0.02*x(1,12) + 0.035*x(1,13)

      + 0.035*x(1,14) =L= 0.89 ; (LHS = 0)

dela(2)..  0.03*x(2,1) + 0.032*x(2,2) + 0.035*x(2,3) + 0.012*x(2,4)

      + 0.02*x(2,5) + 0.012*x(2,6) + 0.03*x(2,7) + 0.015*x(2,8) + 0.027*x(2,9)

      + 0.012*x(2,10) + 0.03*x(2,11) + 0.02*x(2,12) + 0.035*x(2,13)

      + 0.035*x(2,14) =L= 1.02 ; (LHS = 0)
```

```
dela(3)..  0.03*x(3,1) + 0.032*x(3,2) + 0.035*x(3,3) + 0.012*x(3,4)

      + 0.02*x(3,5) + 0.012*x(3,6) + 0.03*x(3,7) + 0.015*x(3,8) + 0.027*x(3,9)

      + 0.012*x(3,10) + 0.03*x(3,11) + 0.02*x(3,12) + 0.035*x(3,13)

      + 0.035*x(3,14) =L= 2.34 ; (LHS = 0)


---- requ  =G=   q(i) bigger then bandwidth requirement b(i) in Model I

requ(1)..  q(1) =G= 160 ; (LHS = 0, INFES = 160 ***)

requ(2)..  q(2) =G= 80 ; (LHS = 0, INFES = 80 ***)

requ(3)..  q(3) =G= 25 ; (LHS = 0, INFES = 25 ***)


---- sour  =E=   Source sum is 1 in Model I

sour(1)..  x(1,1) + x(1,2) + x(1,3) =E= 1 ; (LHS = 0, INFES = 1 ***)

sour(2)..  x(2,1) + x(2,2) + x(2,3) =E= 1 ; (LHS = 0, INFES = 1 ***)

sour(3)..  x(3,1) + x(3,2) + x(3,3) =E= 1 ; (LHS = 0, INFES = 1 ***)


---- inout2  =E=   in equal out in node 2 in Model I

inout2(1)..  x(1,1) - x(1,4) - x(1,5) - x(1,6) =E= 0 ; (LHS = 0)

inout2(2)..  x(2,1) - x(2,4) - x(2,5) - x(2,6) =E= 0 ; (LHS = 0)

inout2(3)..  x(3,1) - x(3,4) - x(3,5) - x(3,6) =E= 0 ; (LHS = 0)


---- inout3  =E=   in equal out in node 3 in Model I

inout3(1)..  x(1,2) + x(1,4) - x(1,7) - x(1,8) =E= 0 ; (LHS = 0)

inout3(2)..  x(2,2) + x(2,4) - x(2,7) - x(2,8) =E= 0 ; (LHS = 0)

inout3(3)..  x(3,2) + x(3,4) - x(3,7) - x(3,8) =E= 0 ; (LHS = 0)


---- inout4  =E=   in equal out in node 4 in Model I

inout4(1)..  x(1,3) + x(1,5) + x(1,7) - x(1,9) - x(1,10) - x(1,11) =E= 0 ;

      (LHS = 0)

inout4(2)..  x(2,3) + x(2,5) + x(2,7) - x(2,9) - x(2,10) - x(2,11) =E= 0 ;

      (LHS = 0)

inout4(3)..  x(3,3) + x(3,5) + x(3,7) - x(3,9) - x(3,10) - x(3,11) =E= 0 ;

      (LHS = 0)


---- inout5  =E=   in equal out in node 5 in Model I
```

```
inout5(1)..  x(1,6) + x(1,9) + x(1,12) - x(1,13) =E= 0 ; (LHS = 0)

inout5(2)..  x(2,6) + x(2,9) + x(2,12) - x(2,13) =E= 0 ; (LHS = 0)

inout5(3)..  x(3,6) + x(3,9) + x(3,12) - x(3,13) =E= 0 ; (LHS = 0)


---- inout6  =E=   in equal out in node 6 in Model I

inout6(1)..  x(1,8) + x(1,10) - x(1,12) - x(1,14) =E= 0 ; (LHS = 0)

inout6(2)..  x(2,8) + x(2,10) - x(2,12) - x(2,14) =E= 0 ; (LHS = 0)

inout6(3)..  x(3,8) + x(3,10) - x(3,12) - x(3,14) =E= 0 ; (LHS = 0)


---- dest  =E=   Destination sum is 1 in Model I

dest(1)..  x(1,11) + x(1,13) + x(1,14) =E= 1 ; (LHS = 0, INFES = 1 ***)

dest(2)..  x(2,11) + x(2,13) + x(2,14) =E= 1 ; (LHS = 0, INFES = 1 ***)

dest(3)..  x(3,11) + x(3,13) + x(3,14) =E= 1 ; (LHS = 0, INFES = 1 ***)


---- weig  =E=   Sum of weight equal to 1 in Model I

weig..  w(1) + w(2) + w(3) =E= 1 ; (LHS = 0, INFES = 1 ***)



G e n e r a l   A l g e b r a i c   M o d e l i n g   S y s t e m
Column Listing      SOLVE Model_I Using MINLP From line 209


---- Z   Total utilijation sum in Model I

Z
                (.LO, .L, .UP = -INF, 0, +INF)
        1       OBJ


---- q   Bandwidth of each class i in Model I

q(1)
                (.LO, .L, .UP = 0, 0, +INF)
       (0)      OBJ
       (0)      budg
       (0)      capa(1)
       (0)      capa(2)
       (0)      capa(3)
       (0)      capa(4)
       (0)      capa(5)
       (0)      capa(6)
       (0)      capa(7)
       (0)      capa(8)
       (0)      capa(9)
       (0)      capa(10)
       (0)      capa(11)
       (0)      capa(12)
       (0)      capa(13)
       (0)      capa(14)
        1       requ(1)
```

```
q(2)
                (.LO, .L, .UP = 0, 0, +INF)
        (0)     OBJ
        (0)     budg
        (0)     capa(1)
        (0)     capa(2)
        (0)     capa(3)
        (0)     capa(4)
        (0)     capa(5)
        (0)     capa(6)
        (0)     capa(7)
        (0)     capa(8)
        (0)     capa(9)
        (0)     capa(10)
        (0)     capa(11)
        (0)     capa(12)
        (0)     capa(13)
        (0)     capa(14)
         1      requ(2)

q(3)
                (.LO, .L, .UP = 0, 0, +INF)
        (0)     OBJ
        (0)     budg
        (0)     capa(1)
        (0)     capa(2)
        (0)     capa(3)
        (0)     capa(4)
        (0)     capa(5)
        (0)     capa(6)
        (0)     capa(7)
        (0)     capa(8)
        (0)     capa(9)
        (0)     capa(10)
        (0)     capa(11)
        (0)     capa(12)
        (0)     capa(13)
        (0)     capa(14)
         1      requ(3)


---- w   Weight of each class i in Model I

w(1)
                (.LO, .L, .UP = 0, 0, +INF)
      (23.9933) OBJ
         1      weig

w(2)
                (.LO, .L, .UP = 0, 0, +INF)
      (22.9847) OBJ
         1      weig

w(3)
                (.LO, .L, .UP = 0, 0, +INF)
      (21.417)  OBJ
         1      weig


---- x   Binary variables in Model I

x(1,1)
```

```
              (.LO, .L, .UP = 0, 0, 1)
       (0)       budg
       (0)       capa(1)
        0.03     dela(1)
        1        sour(1)
        1        inout2(1)

x(1,2)
              (.LO, .L, .UP = 0, 0, 1)
       (0)       budg
       (0)       capa(2)
        0.032    dela(1)
        1        sour(1)
        1        inout3(1)

x(1,3)
              (.LO, .L, .UP = 0, 0, 1)
       (0)       budg
       (0)       capa(3)
        0.035    dela(1)
        1        sour(1)
        1        inout4(1)

REMAINING 39 ENTRIES SKIPPED


G e n e r a l   A l g e b r a i c   M o d e l i n g   S y s t e m
Model Statistics    SOLVE Model_I Using MINLP From line 209


MODEL STATISTICS

BLOCKS OF EQUATIONS      13     SINGLE EQUATIONS       44
BLOCKS OF VARIABLES       4     SINGLE VARIABLES       49
NON ZERO ELEMENTS       268     NON LINEAR N-Z        135
DERIVATIVE POOL          52     CONSTANT POOL          40
CODE LENGTH             996     DISCRETE VARIABLES     42


GENERATION TIME      =        0.031 SECONDS    3.9 Mb  WIN213-138 Feb 03, 2004


EXECUTION TIME       =        0.031 SECONDS    3.9 Mb  WIN213-138 Feb 03, 2004


G e n e r a l   A l g e b r a i c   M o d e l i n g   S y s t e m
Solution Report     SOLVE Model_I Using MINLP From line 209


               S O L V E      S U M M A R Y

     MODEL   Model_I             OBJECTIVE  Z
     TYPE    MINLP               DIRECTION  MAXIMIZE
     SOLVER  BARON               FROM LINE  209

**** SOLVER STATUS     1 NORMAL COMPLETION
**** MODEL STATUS      8 INTEGER SOLUTION
**** OBJECTIVE VALUE                2.0506

 RESOURCE USAGE, LIMIT          1.970      1000.000
 ITERATION COUNT, LIMIT         0         10000
 EVALUATION ERRORS              0             0
```

```
Baron 6.0     Jan 19, 2004 WIN.BA.NA 21.3 006.000.000.VIS P3PC

Branch And Reduce Optimization Navigator
Nikolaos Sahinidis and Mohit Tawarmalani
The Optimization Firm, LLC.

  Total time elapsed   :     000:00:02,    in seconds:          1.97
       on parsing      :     000:00:00,    in seconds:          0.03
       on preprocessing:     000:00:01,    in seconds:          0.52
       on navigating   :     000:00:00,    in seconds:          0.03
       on relaxed      :     000:00:00,    in seconds:          0.06
       on local        :     000:00:00,    in seconds:          0.09
       on tightening   :     000:00:00,    in seconds:          0.03
       on marginals    :     000:00:00,    in seconds:          0.00
       on probing      :     000:00:01,    in seconds:          1.20

   Total no. of BaR iterations:     201
   Best solution found at node:      10
   Max. no. of nodes in memory:       4


Solution      = 2.05062619744  found at node 10
Best possible = 2.27847355271
Absolute gap  = 0.22784735527  optca = 0.1
Relative gap  = 0.10000  optcr = 0.1


                       LOWER     LEVEL     UPPER    MARGINAL

---- EQU OBJ             .         .         .        1.000
---- EQU budg           -INF  1.0000E+6 1.0000E+6 6.2185E-6

  OBJ   Maximizing total utilijation sum in Model I
  budg   Sum of q(i)*x(i,e) is smaller then budget in Model I

---- EQU capa   Smaller then capacity in Model I

      LOWER     LEVEL     UPPER    MARGINAL

1      -INF  30400.000 2.3000E+5      .
2      -INF  19600.000 3.5000E+5      .
3      -INF       .    1.0000E+5      .
4      -INF       .    2.5000E+5      .
5      -INF  30400.000 2.1000E+5      .
6      -INF       .    2.2000E+5      .
7      -INF       .    2.0000E+5      .
8      -INF  19600.000 3.0000E+5      .
9      -INF  30400.000 2.1000E+5      .
10     -INF       .    2.7000E+5      .
11     -INF       .    1.5000E+5      .
12     -INF       .    1.8000E+5      .
13     -INF  30400.000 3.0000E+5      .
14     -INF  19600.000 3.5000E+5      .

---- EQU dela   Smaller then delay in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1     -INF      0.112     0.890       .
2     -INF      0.082     1.020       .
3     -INF      0.082     2.340       .

---- EQU requ   q(i) bigger then bandwidth requirement b(i) in Model I
```

```
     LOWER     LEVEL     UPPER    MARGINAL

1   160.000   160.000     +INF     -0.024
2    80.000    80.000     +INF     -0.012
3    25.000   116.000     +INF       .

---- EQU sour   Source sum is 1 in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1     1.000     1.000     1.000    -0.945
2     1.000     1.000     1.000    -0.249
3     1.000     1.000     1.000    -0.361

---- EQU inout2   in equal out in node 2 in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1      .         .         .         .
2      .         .         .         .
3      .         .         .         .

---- EQU inout3   in equal out in node 3 in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1      .         .         .       -0.189
2      .         .         .       -0.050
3      .         .         .       -0.072

---- EQU inout4   in equal out in node 4 in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1      .         .         .       -0.756
2      .         .         .       -0.199
3      .         .         .       -0.289

---- EQU inout5   in equal out in node 5 in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1      .         .         .       -1.890
2      .         .         .       -0.497
3      .         .         .       -0.721

---- EQU inout6   in equal out in node 6 in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1      .         .         .       -1.701
2      .         .         .       -0.448
3      .         .         .       -0.649

---- EQU dest   Destination sum is 1 in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1     1.000     1.000     1.000    -2.836
2     1.000     1.000     1.000    -0.746
3     1.000     1.000     1.000    -1.082
```

```
                      LOWER     LEVEL     UPPER    MARGINAL

---- EQU weig          1.000     1.000     1.000     2.051

  weig   Sum of weight equal to 1 in Model I

                      LOWER     LEVEL     UPPER    MARGINAL

---- VAR Z             -INF      2.051     +INF       .

  Z   Total utilijation sum in Model I

---- VAR q   Bandwidth of each class i in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1      .      160.000     +INF       .
2      .       80.000     +INF       .
3      .      116.000     +INF       .

---- VAR w   Weight of each class i in Model I

     LOWER     LEVEL     UPPER    MARGINAL

1      .         .        +INF     -2.112
2      .         .        +INF     -2.104
3      .        1.000     +INF       .

---- VAR x   Binary variables in Model I

        LOWER     LEVEL     UPPER    MARGINAL

1.1       .        1.000     1.000      EPS
1.2       .          .       1.000      EPS
1.3       .          .       1.000    -0.189
1.4       .          .       1.000    -0.756
1.5       .        1.000     1.000      EPS
1.6       .          .       1.000    -0.189
1.7       .          .       1.000    -0.567
1.8       .          .       1.000      EPS
1.9       .        1.000     1.000      EPS
1.10      .          .       1.000    -0.378
1.11      .          .       1.000    -0.189
1.12      .          .       1.000    -0.945
1.13      .        1.000     1.000      EPS
1.14      .          .       1.000      EPS
2.1       .          .       1.000      EPS
2.2       .        1.000     1.000      EPS
2.3       .          .       1.000    -0.050
2.4       .          .       1.000    -0.199
2.5       .          .       1.000      EPS
2.6       .          .       1.000    -0.050
2.7       .          .       1.000    -0.149
2.8       .        1.000     1.000      EPS
2.9       .          .       1.000      EPS
2.10      .          .       1.000    -0.099
2.11      .          .       1.000    -0.050
2.12      .          .       1.000    -0.249
2.13      .          .       1.000      EPS
2.14      .        1.000     1.000      EPS
3.1       .          .       1.000      EPS
3.2       .        1.000     1.000      EPS
3.3       .          .       1.000    -0.072
```

3.4	.	.	1.000	-0.289
3.5	.	.	1.000	EPS
3.6	.	.	1.000	-0.072
3.7	.	.	1.000	-0.216
3.8	.	1.000	1.000	EPS
3.9	.	.	1.000	EPS
3.10	.	.	1.000	-0.144
3.11	.	.	1.000	-0.072
3.12	.	.	1.000	-0.361
3.13	.	.	1.000	EPS
3.14	.	1.000	1.000	EPS

```
**** REPORT SUMMARY :        0     NONOPT
                             0 INFEASIBLE
                             0  UNBOUNDED
                             0     ERRORS


G e n e r a l   A l g e b r a i c   M o d e l i n g   S y s t e m
E x e c u t i o n


----    216 VARIABLE q.L   Bandwidth of each class i in Model I

1 1.600000E+2,    2 80.00000000,    3 1.160000E+2



EXECUTION TIME       =       0.031 SECONDS    2.9 Mb  WIN213-138 Feb 03, 2004


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**** FILE SUMMARY
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