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

```
INCLUDE    /var/www/html/interfaces/cgi-bin/thermaldis/ex1.dat
INCLUDE    /var/www/html/interfaces/cgi-bin/thermaldis/preset.inc
   3
   4
   7
   8  * ====== options list=======================================================
   9
  10  option limrow=0;
  11  option limcol=0;
  12  option iterlim=100000000;
  13  option reslim = 10000000;
  14  option solprint=on;
  15  option sysout=off;
  16  option nlp=conopt;
  17  option minlp=sbb;
  18  option optcr=0;
  19  option mip=cplex;
  20  *===============================================================================
  21
```

THERMALLY COUPLED DISTILLATION.

This model obtain the optimal (minimum cost) sequence among all the alternatives sequences for mixtures of 5 components that do not form azeotropes and have near ideal behavior.

The model uses a modified version of the Fenske-Underwood shortcut equations.

See:

for a detailed description of the model:

PART I.
A set of logical relationships that assure only basic sequences together with all the possibilities for internal heat exchangers.

Logical constraints:

1.- A given state can produce at most, a separation task

2.- A given state can be produced by, at most two tasks.
If it is produced by two tasks, one must be from a rectifying section

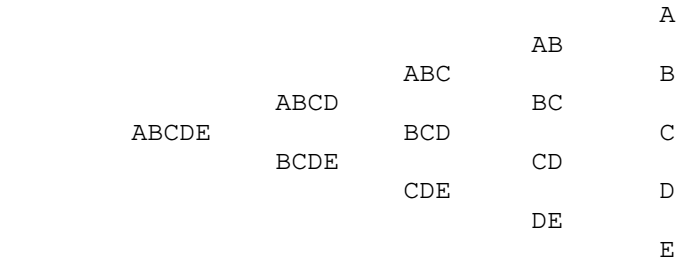
and the other from a stripping section

3.- Lightest and heaviest final products are produced only by a column the rest can be produced by one or two contributions (more than two produce non-basic sequences).
If it is produced by two tasks, one must be from a rectifying section

and the other from a stripping section

5.- Connectivity equations

Superstructure (based on states)



Note: code for separation tasks:

1.- A/BCDE 2.- AB/CDE 3.- AB/BCDE 4.- ABC/BCDE 5.- ABC/CDE
6.- ABC/DE 7.- ABCD/BCDE 8.- ABCD/CDE 9.- ABCD/DE 10.- ABCD/E

11.- A/BCD 12.- AB/BCD 13.- AB/CD 14.- ABC/BCD 15.- ABC/CD 16.- ABC/D
17.- B/CDE 18.- BC/CDE 19.- BC/DE 20.- BCD/CDE 21.- BCD/DE 22.- BCD/E

23.- A/BC 24.- AB/BC 25.- AB/C
26.- B/CD 27.- BC/CD 28.- BC/D
29.- C/DE 30.- CD/DE 31.- CD/E

32.- A/B 33.- B/C 34 C/D 35.- D/E

```
  91
  92  *=============================================================================================
==========
  93  *        PARTE I LOGICAL RELATIONSHIPS
  94
  95  SETS
  96
  97           t       tasks          /t1*t35/
  98           s       states         /ABCDE, ABCD, BCDE, ABC, BCD, CDE,
  99                                    AB, BC, CD, DE, A, B, C, D, E/
 100
 101           c(s)    pseudo-columns  /ABCDE, ABCD, BCDE, ABC, BCD, CDE, AB, BC, CD, DE/
 102           P(s)    final products  /A, B, C, D, E/
 103
 104          oST(s,t) tasks generated by state s
 105
 106                   /ABCDE.(t1*t10), ABCD.(t11*t16), BCDE.(t17*t22)
 107                    ABC.(t23*t25), BCD.(t26*t28), CDE.(t29*t31)
 108                    AB.(t32), BC.(t33), CD.(t34), DE.(t35) /
 109
 110          iST(s,t) p-columns that produce the state s
 111
 112                / ABCD.(t7,t8,t9,t10), BCDE.(t1,t2,t4,t7), ABC.(t4,t5,t6,t14,t15,t16)
 113                  BCD.(t11,t12,t14,t20,t21,t22), CDE.(t3,t5,t8,t17,t18,t20)
 114                  AB.(t2,t3,t12,t13,t24,t25), BC.(t18,t19,t23,t24,t27,t28)
 115                  CD.(t13,t15,t26,t27,t30,t31), DE.(t6,t9,t19,t21,t29,t30) /
 116
 117
 118          DiST(s,t)  p-columns that produce the state s through a rectifying section
 119
 120                  / ABCD.(t7,t8,t9,t10), ABC.(t4,t5,t6,t14,t15,t16)
 121                    BCD.(t20,t21,t22), AB.(t2,t3,t12,t13,t24,t25)
 122                    BC.(t18,t19,t27,t28), CD.(t30,t31) /
```

```
 123
 124          BiST(s,t) p-columns that produce the state s through a stripping section
 125                  / BCDE.(t1,t2,t4,t7), BCD.(t11,t12,t14)
 126                    CDE.(t3,t5,t8,t17,t18,t20), BC.(t23,t24)
 127                    CD.(t13,t15,t26,t27), DE.(t6,t9,t19,t21,t29,t30) /
 128
 129          DiSTT(s,t)
 130          BiSTT(s,t)
 131
 132          PRODR(s,t) pure products generated by tasks t by a rectifying section
 133
 134                  /A.(t1,t11,t23,t32), B.(t17,t26,t33), C.(t29,t34), D.(t35) /
 135
 136          PRODS(s,t) pure products generated by tasks t by a rectifying section
 137
 138                  /B.(t32), C.(t25,t33), D.(t16,t28,t34), E.(t10,t22,t31,t35)/
 139
 140          PRODT(s,t)
 141
 142
 143          ;
 144
 145          PRODT(s,t) = PRODR(s,t) + PRODS(s,t);
 146          DiSTT(s,t) = DiST(s,t) + PRODR(s,t);
 147          BiSTT(s,t) = BiST(s,t) + PRODS(s,t);
 148
 149  ;
 150  alias(t,tt);
 151  alias(s,ss);
 152
 153  SETS
 154
 155          INT_HE(s,t,tt)  stripping-rectifying section in intermediate heat exchangers
 156
 157                 /BCD.(t11,t12,t14).(t20,t21,t22)
 158                  BC.(t18,t19,t27,t28).(t23,t24)
 159                  CD.(t30,t31).(t13,t15,t26,t27)/
 160          ;
 161
 162  SCALAR
 163          N       number of components /5/;
 164
 165
 166  BINARY VARIABLES
 167
 168           y(t)    task t exists
 169           Wbin(s)  Heat exchanger associated to state s exists
 170  ;
 171  VARIABLE
 172           W(s) idem that Wbin but used to relax integrality of Wbin;
 173  VARIABLE
 174           z(s)  state s exists view note
 175           zobj  objective function;
 176
 177  * Note: z(s) and y(t)  are 'strictly speaking' binaries, however only is
 178  *       necessary to define one as binary, logical relations assure that the other
 179  *       take integer values. Numerical results showed that better results were obtained
 180  *       using y(t) as binary even though the number of such variables is larger than z(s
)!!!
 181
 182  EQUATIONS
 183           dummy
 184           logic1, logic2, logic3, logic4, logic5, logic6
```

```
 185          logic7, logic8, logic9, logic10, logic11, logic12
 186          logic13, logic14, logic15
 187          logicaux, logicaux2;
 188
 189  dummy..  zobj=e= 1;
 190
 191  *               A given state can produce at most, a separation task
 192
 193  logic1(c(s))..           sum(t$(oST(s,t)), y(t)) =l= 1;
 194
 195  *               A given state can be produced by, at most two tasks.
 196  *                 If it is produced by two tasks, one must be from a rectifying section
 197  *                 and the other from a stripping section
 198
 199  logic2(c(s))..          sum(t$(DiST(s,t)), y(t)) =l= 1;
 200  logic3(c(s))..          sum(t$(BiST(s,t)), y(t)) =l= 1;
 201
 202  *               Lightest and heaviest final products are produced only by a column
 203  *                the rest can be produced by one or two contributions (more than
 204  *                two produce non-basic sequences).
 205  *                If it is produced by two tasks, one must be from a rectifying section
 206  *                and the other from a stripping section
 207  *                If it is produced only by one contribution a heat exchanger must appea
r
 208
 209
 210  logic4(P(s))..    sum(t$(PRODT(s,t)), y(t)) =g= 1;
 211  logic5(P(s))..    sum(t$(PRODR(s,t)), y(t)) =l= 1;
 212  logic6(P(s))..    sum(t$(PRODS(s,t)), y(t)) =l= 1;
 213
 214  *                 Relations heat exchangers tasks
 215
 216  logic7(P(s))..  sum(t$(PRODR(s,t)), y(t)) + W(s) =g= 1;
 217  logic8(P(s))..  sum(t$(PRODS(s,t)), y(t)) + W(s) =g= 1;
 218
 219  logic9(P(s),t,tt)$(PRODR(s,t) AND PRODS(s,tt)).. 1-y(t) + 1-y(tt) + 1-W(s) =g= 1;
 220
 221  *      Logic for intermediate heat exchangers
 222
 223  logic10(c(s))$(ord(s) gt 1).. 1-W(s) + sum(t$(iST(s,t)),y(t)) =g= 1;
 224
 225  logic11(INT_HE(s,t,tt))..       1-W(s) + 1-y(t) + 1-y(tt) =g= 1;
 226
 227  *     Connectivity equations
 228
 229  logic12(iST(s,t))$(ord(s) gt 1)..  1-y(t) + sum(tt$oST(s,tt), y(tt)) =g= 1;
 230  logic13(oST(s,t))$(ord(s) gt 1)..  1-y(t) + sum(tt$iST(s,tt), y(tt)) =g= 1;
 231
 232
 233
 234  *        relations between states and tasks     (states continuous variables tasks binar
ies)
 235
 236  logic14(oST(s,t))..              1 - y(t) + z(s) =g= 1;
 237  logic15(c(s))..                  1 - z(s) + sum(t$oST(s,t), y(t)) =g= 1;
 238
 239  logicaux(P(s))..     W(s) =e= Wbin(s);
 240  logicaux2(C(s))..    W(s) =e= Wbin(s);
 241
 242  *=============================================================================
===
 243
 244
```

```
 245
 246  *        BINARY CUT
 247
 248
 249  SET
 250           it /1*20/;
 251
 252  PARAMETERS
 253  ITER, B1(s,it), N1(s,it)
 254  ;
 255
 256  EQUATIONS
 257           cut1;
 258
 259  Cut1(it)$((ord(it) gt 1) AND (ord(it) le ITER))..
 260           sum(s, B1(s,it)*z(s)) - sum(s, N1(s,it)*z(s)) =l= sum(s, B1(s,it)) - 1;
 261
 262
 263  *=============================================================================
 264
 265
 266  alias(s,ss);
 267  alias(s,sss);
 268
 269  *        PART II COLUMN EQUATIONS: SHORTCUT METHOD OF UNDERWOOD GILLILAND FENSKE
 270
 271  SETS
 272           i components /A, B, C, D, E/
 273           r Underwood roots /r1, r2, r3, r4/
 274
 275           RUA(s,r) active underwood roots in the column c
 276                   /ABCDE.(r1,r2,r3,r4), ABCD.(r1,r2,r3), BCDE.(r2,r3,r4)
 277                    ABC.(r1,r2), BCD.(r2,r3), CDE.(r3,r4)
 278                    AB.r1, BC.r2, CD.r3, DE.r4/
 279
 280           COLD(s,ss)      column s sends distillate to column ss
 281                    /ABCDE.ABCD, ABCD.ABC, ABC.AB, BCDE.BCD, BCD.BC, CDE.CD/
 282
 283           COLB(s,ss)      column s sends bottoms to column ss
 284                    /ABCDE.BCDE, BCDE.CDE, CDE.DE, ABCD.BCD, BCD.CD, ABC.BC/
 285
 286
 287           COLDT(s,ss)      same as COLD including final products
 288                    /ABCDE.ABCD, ABCD.ABC, ABC.AB, AB.A, BCDE.BCD, BCD.BC,BC.B, CDE.CD, CD
.C, DE.D/
 289
 290           COLBT(s,ss)      same as COLDB including final products
 291                    /ABCDE.BCDE, BCDE.CDE, CDE.DE, DE.E, ABCD.BCD, BCD.CD, CD.D, ABC.BC, B
C.C, AB.B/
 292
 293
 294           ARRIBA(s) /ABCD, ABC, AB/
 295           ABAJO(s) /BCDE, CDE, DE/
 296
 297           CAMCAL(s,ss) possible heat exchange between condenser s and reboiler ss
 298                   /A.(BC,BCD,BCDE,C,CD,CDE,D,DE,E), AB.(BCD,BCDE,C,CD,CDE,D,DE,E)
 299                    ABC.(B,BCDE,C,CD,CDE,D,DE,E), ABCD.(B,BC,C,CD,CDE,D,DE,E)
 300                    B.(BC,BCD,BCDE,C,CD,CDE,D,DE,E), BC.(B,BCD,BCDE,C,CD,CDE,D,DE,E)
 301                    BCD.(B,BC,BCDE,C,CD,CDE,D,DE,E), BCDE.(B,BC,BCD,C,CD,CDE,D,DE,E)
 302                    C.(B,BC,BCD,BCDE,CD,CDE,D,DE,E), CD.(B,BC,BCD,BCDE,C,CDE,D,DE,E)
 303                    D.(B,BC,BCD,BCDE,C,CD,CDE)/
 304
 305           COLT(s,ss)
```

```
 306  ;
 307           COLT(s,ss) = COLDT(s,ss) + COLBT(s,ss);
 308
 309  alias(i,j);
 310
 311
 312  PARAMETERS
 313
 314          LK(t)    position number of the light key
 315                   /t1   1, t2   1, t3   2, t4   1, t5   2, t6   3, t7   1
 316                   t8   2, t9   3, t10  4, t11  1, t12  1, t13  2, t14  1
 317                   t15  2, t16  3, t17  2, t18  2, t19  3, t20  2, t21  3
 318                   t22  4, t23  1, t24  1, t25  2, t26  2, t27  2, t28  3
 319                   t29  3, t30  3, t31  4, t32  1, t33  2, t34  3, t35  4 /
 320
 321
 322          HK(t)    position number of the heavy key
 323                  /t1   2, t2   3, t3   3, t4   4, t5   4, t6   4, t7   5
 324                   t8   5, t9   5, t10  5, t11  2, t12  3, t13  3, t14  4
 325                   t15  4, t16  4, t17  3, t18  4, t19  4, t20  5, t21  5
 326                   t22  5, t23  2, t24  3, t25  3, t26  3, t27  4, t28  4
 327                   t29  4, t30  5, t31  5, t32  2, t33  3, t34  4, t35  5 /
 328  ;
 329
      * EXAMPLE 1.

               A = Benzene
               B = Toluene
               C = EthylBenzene
               D = Styrene
               E = Alpha-Methylstyrene

 340
 341  Set ii        /  Benzene, Toluene,  EthylBenzene, Styrene, alpha-Methylstyrene/;
 342
 343
 344  SCALAR
 345           Ff  feed molar flow Divided by 100 /2/
 346           M1  big M /10/
 347           M2  big M /2/
 348           M   big M /200/
 349           MM  big M /1000/
 350           MMM big M /1/
 351           tac /1/;
 352
 353  PARAMETERS
 354
 355           alpha(i) relative volatility
 356                    /A  10.5
 357                     B  4.04
 358                     C  1.76
 359                     D  1.31
 360                     E  1/
 361
 362           zf(i)  feed mole fraction
 363                  /  A  0.3
 364                     B  0.2
 365                     C  0.1
 366                     D  0.2
 367                     E  0.2/    ;
 368
 369  * This data is used in Part 3
 370
```

```
 371  PARAMETERS
 372           Pr              Nominal pressure atm
 373           NPmin(t)        Minimum number of trays in task t
 374           NP(t)           Actual number of trays calculated as 2*NPmin
 375           NPmax           Max number of trays
 376           H(t)            Length of the column t
 377           PPM             Molecular weight g mol-1
 378
 379           PM(i) molecular weight /A 78
 380                                  B 92
 381                                  C 106
 382                                  D 104
 383                                  E 118/
 384
 385           Hvap(i) vaporization enthalpy KJmol-1 /A  30.77
 386                                                 B  33.19
 387                                                 C  35.58
 388                                                 D  36.83
 389                                                 E  38.30 /
 390           roL     liquid density assumed constant kg m-3
 391           rov     Vapor density calculated in feed tray g L-1
 392           rec     recovery of each component in a column
 393           Tf      feed temperature celsius ;
 394
 395  rec=0.98;
 396  NPmin(t) = log(rec**2/(1-rec)**2)/log(sum(i$(ord(i) eq LK(t)),alpha(i))/sum(i$(ord(i) eq
 HK(t)),alpha(i)));
 397  NP(t) = 2*NPmin(t);
 398  NPmax = smax(t, NP(t));
 399  roL=810;
 400  PPM   = sum(i, zf(i)*PM(i));
 401  Tf = 85.122;
 402  Pr = 0.5;
 403  rov =  PPM*Pr/0.082/(Tf + 273) ;
 404  H(t) = NP(t)*0.6 + 4;
 405
 406
 407
 408  VARIABLES
 409           zobj   objective function
 410           zobj2;
 411
 412  POSITIVE VARIABLES
 413          V1(s), V2(s), L1(s), L2(s)   "total flows (kmol/h) of vapor and liquid in rec an
d str sections"
 414           F(s), D(s), B(s)             "total flows (kmol/h) of feed, distillate and botto
ms"
 415           Fi(s,i), Di(s,i), Bi(s,i)    "individual flows (kmol/h) of feed, distillate and
bottoms"
 416           rud(s,r)                     Underwood root
 417
 418  ;
 419
INCLUDE    /var/www/html/interfaces/cgi-bin/thermaldis/model.inc
 421
 422  ***************************************************************************
 423  ** ** ** ** ** ** ** EQUATION FILE FOR THERMALDIS ** ** ** ** ** ** ** **
 424  ***************************************************************************
 425
 426  EQUATIONS
 427
 428           objfun
 429           objfunk
```

```
 430           eq1, eq1b, eq2, eq2b, eq3, eq4, eq5, eq6a, eq6b, eq7a, eq7b,
 431           eq8,
 432           eq10, eq11, eq12, eq13,eq14, eq15, eq16,eq17, eq18,
 433           eq19, eq20, eq21, eq22, eq23, eq24, eq25, eq26, eq27,  eq28
 434           eq29,  eq30, eq31, eq32, eq33, eq34, eq35, eq36, eq37, eq38
 435           eq39, eq40, eq41, eq42, eq43, eq44, eq45
 436           uw1a, uw1b,  uw2, uw3
 437  ;
 438
 439
 440  * Feed is assigned to first column
 441
 442  eq1(i,s)$(ord(s) eq 1)..       Fi(s,i) =e= Ff*zf(i);
 443  eq1b(s)$(ord(s) eq 1)..        V2(s) =e= V1(s);
 444
 445  * mass balances
 446
 447  eq2(c(s),i)..     Fi(s,i) =l= Di(s,i) + Bi(s,i) + M2*(1-z(s));
 448  eq2b(c(s),i)..    Fi(s,i) =g= Di(s,i) + Bi(s,i) - M2*(1-z(s));
 449
 450  eq3(c(s))..       F(s) =e= sum(i, Fi(s,i));
 451  eq4(c(s))..       D(s) =e= sum(i, Di(s,i));
 452  eq5(c(s))..       B(s) =e= sum(i, Bi(s,i));
 453
 454  eq6a(c(s))..       D(s) =l= V1(s) - L1(s) + M1*(1-z(s));
 455  eq6b(c(s))..       D(s) =g= V1(s) - L1(s) - M1*(1-z(s));
 456
 457  eq7a(c(s))..       B(s) =l= L2(s) - V2(s) + M1*(1-z(s));
 458  eq7b(c(s))..       B(s) =g= L2(s) - V2(s) - M1*(1-z(s));
 459
 460
 461  * Mass balances among columns
 462
 463  *        columns exists
 464  *                this equation does not depend on the thermal state of stream
 465
 466  eq8(c(ss),i)$(ord(ss) gt 1)..
 467                  Fi(ss,i) =e= sum(s$COLD(s,ss), Di(s,i)) + sum(s$COLB(s,ss), Bi(s,i)) ;
 468
 469  *               There is not heat exchanger associated to state ss (this equation appea
r even
 470  *               in the case in which there is not state ss)
 471
 472  eq10(c(ss))$(ord(ss) gt 1)..
 473                  V1(ss) + sum(s$COLB(s,ss),V2(s)) - V2(ss) - sum(s$COLD(s,ss), V1(s)) =l
= M1*W(ss);
 474  eq11(c(ss))$(ord(ss) gt 1)..
 475                  V1(ss) + sum(s$COLB(s,ss),V2(s)) - V2(ss) - sum(s$COLD(s,ss), V1(s)) =g
= -M1*W(ss);
 476
 477  eq12(c(ss))$(ord(ss) gt 1)..
 478                  L1(ss) + sum(s$COLB(s,ss),L2(s)) - L2(ss) - sum(s$COLD(s,ss), L1(s)) =l
= M1*W(ss);
 479  eq13(c(ss))$(ord(ss) gt 1)..
 480                  L1(ss) + sum(s$COLB(s,ss),L2(s)) - L2(ss) - sum(s$COLD(s,ss), L1(s)) =g
= -M1*W(ss);
 481
 482  *               There is a heat exchanger NOTE: (q=1 V2=V1) (q=0 L2=L1)
 483
 484  eq14(c(s))..     V2(s) - V1(s) =l= M1*(1-W(s));
 485  eq15(c(s))..     V2(s) - V1(s) =g= -M1*(1-W(s));
 486
 487  *        columns does not exist
```

```
488
489  eq16(c(ss))$(ord(ss) gt 1 and not ABAJO(ss))..
490                  V1(ss) =l= sum(s$COLD(s,ss), V1(s)) + M1*z(ss);
491  eq17(c(ss))$(ord(ss) gt 1 and not ABAJO(ss))..
492                  V1(ss) =g= sum(s$COLD(s,ss), V1(s)) - M1*z(ss);
493
494  eq18(c(ss))$(ord(ss) gt 1 and not ABAJO(ss))..
495                  L1(ss) =l= sum(s$COLD(s,ss), L1(s)) + M1*z(ss);
496  eq19(c(ss))$(ord(ss) gt 1 and not ABAJO(ss))..
497                  L1(ss) =g= sum(s$COLD(s,ss), L1(s)) - M1*z(ss);
498
499
500  eq20(c(ss))$(ord(ss) gt 1 and not ARRIBA(ss))..
501                  L2(ss) =l= sum(s$COLB(s,ss), L2(s)) + M1*z(ss);
502  eq21(c(ss))$(ord(ss) gt 1 and not ARRIBA(ss))..
503                  L2(ss) =g= sum(s$COLB(s,ss), L2(s)) - M1*z(ss);
504
505  eq22(c(ss))$(ord(ss) gt 1 and not ARRIBA(ss))..
506                  V2(ss) =l= sum(s$COLB(s,ss), V2(s)) + M1*z(ss);
507  eq23(c(ss))$(ord(ss) gt 1 and not ARRIBA(ss))..
508                  V2(ss) =g= sum(s$COLB(s,ss), V2(s)) - M1*z(ss);
509
510  eq24(c(ss),i)$(ord(ss) gt 1 and not ABAJO(ss))..
511                  Di(ss,i) =l= sum(s$COLD(s,ss), Di(s,i)) + M2*z(ss);
512  eq25(c(ss),i)$(ord(ss) gt 1 and not ABAJO(ss))..
513                  Di(ss,i) =g= sum(s$COLD(s,ss), Di(s,i)) - M2*z(ss);
514
515  eq26(c(ss),i)$(ord(ss) gt 1 and not ARRIBA(ss))..
516                  Bi(ss,i) =l= sum(s$COLB(s,ss), Bi(s,i)) + M2*z(ss);
517  eq27(c(ss),i)$(ord(ss) gt 1 and not ARRIBA(ss))..
518                  Bi(ss,i) =g= sum(s$COLB(s,ss), Bi(s,i)) - M2*z(ss);
519
520
521
522  *       Total recovery of final products (total recovery approximation)
523
524  eq28..          D('AB') =e= Ff*zf('A');
525  eq29..          B('AB') + D('BC') =e= Ff*zf('B');
526  eq30..          B('BC') + D('CD') =e= Ff*zf('C');
527  eq31..          B('CD') + D('DE') =e= Ff*zf('D');
528  eq32..          B('DE') =E= Ff*zf('E');
529
530  *       If there is not final heat exchanger products are produced by 2 contributions
531
532  eq33..          L2('AB') - L1('BC') =l= Ff*zf('B') + M1*W('B');
533  eq34..          L2('AB') - L1('BC') =g= Ff*zf('B') - M1*W('B');
534  eq35..          L2('BC') - L1('CD') =l= Ff*zf('C') + M1*W('C');
535  eq36..          L2('BC') - L1('CD') =g= Ff*zf('C') - M1*W('C');
536  eq37..          L2('CD') - L1('DE') =l= Ff*zf('D') + M1*W('D');
537  eq38..          L2('CD') - L1('DE') =g= Ff*zf('D') - M1*W('D');
538
539  *       forcing some zeros if limiting columns do not exist
540
541  eq39(ARRIBA(s))..       V2(s) =l= M1*z(s);
542  eq40(ARRIBA(s))..       L2(s) =l= M1*z(s);
543  eq41(ABAJO(s))..        V1(s) =l= M1*z(s);
544  eq42(ABAJO(s))..        L1(s) =l= M1*z(s);
545
546
547  * Recovery of each column. total split
548
549  eq43(oST(s,t),i)$(ord(i) le LK(t))..     Fi(s,i) - Di(s,i) =l= M2*(1-y(t));
550  eq44(oST(s,t),i)$(ord(i) le LK(t))..     Fi(s,i) - Di(s,i) =g= -M2*(1-y(t));
```

```
 551  eq45(oST(s,t),i)$(ord(i) ge HK(t)).. Di(s,i) =l= M2*(1-y(t));
 552
 553
 554  * Underwood equations
 555
 556  uw1a(RUA(s,r)).. 1.2*sum(i, alpha(i)*Fi(s,i)/(alpha(i) - rud(s,r))) - (V1(s) - V2(s))
=l=  M*(1-z(s));
 557  uw1b(RUA(s,r)).. 1.2*sum(i, alpha(i)*Fi(s,i)/(alpha(i) - rud(s,r))) - (V1(s) - V2(s))
=g=  -M*(1-z(s));
 558
 559  uw2(RUA(s,r)).. 1.2*sum(i, alpha(i)*Di(s,i)/(alpha(i) - rud(s,r))) =l= V1(s) + M*(1-z
(s));
 560  uw3(RUA(s,r)).. -1.2*sum(i, alpha(i)*Bi(s,i)/(alpha(i) - rud(s,r))) =l= V2(s) + M*(1-
z(s));
 561
 562  *=====================================================================================
================
 563
 564  * PART III.- SIZING COSTING AND ENERGY BALANCES
 565
 566
 567
 568
 569
 570  POSITIVE VARIABLES
 571
 572
 573          WR(s), WC(s)       heat exchanger is a reboiler or a condenser
 574          Qreb(s), Qcond(s)  Heat load in reboiler and condenser
 575
 576
 577          Ar(s)              Area of columns s
 578          Volumen(t)         Volumen in the column t
 579          Vol(s)             Volume of the task s
 580
 581          Cpisos(s)          Related to cost estimation
 582          CostPisos
 583          CP(s)
 584          CostColumn(s)
 585          NumPisos(s)
 586          VV(s)           max of V1 and V2;
 587
 588
 589  EQUATIONS
 590          objfun2
 591          heat5, heat6, heat7, heat8, heat9, heat10
 592          heat11, heat12, heat13, heat14
 593          Area1, Area2, Area3, Area4, Area5, Area6
 594          Coste1, Coste2, Coste3, Coste4, Coste5
 595          ;
 596
 597
 598
 599  heat5(s)..       WR(s) + WC(s) =l= 1;
 600  heat6(s)..       W(s) =e= WR(s) + WC(s);
 601  heat7(DiST(s,t)).. 1-y(t) + 1-W(s) + WC(s) =g= 1;
 602  heat8(PRODR(s,t)).. 1-y(t) + 1-W(s) + WC(s) =g= 1;
 603  heat9(BiST(s,t)).. 1-y(t) + 1-W(s) + WR(s) =g= 1;
 604  heat10(PRODS(s,t)).. 1-y(t) + 1-W(s) + WR(s) =g= 1;
 605
 606  * Calculation of heat loads in condenser and reboiler
 607
 608  heat11(COLDT(s,ss)).. 100*Qcond(ss)*D(s) - V1(s)*sum(i,Di(s,i)*Hvap(i)) =g= -MM*(1-WC
```

```
(ss));
 609  heat12(COLDT(s,ss))..    100*Qcond(ss)*D(s) - V1(s)*sum(i,Di(s,i)*Hvap(i)) =l= MM*(1-WC(
ss));
 610
 611  heat13(COLBT(s,ss))..    100*Qreb(ss)*B(s) - V2(s)*sum(i,Bi(s,i)*Hvap(i)) =g= -MM*(1-WR(
ss));
 612  heat14(COLBT(s,ss))..    100*Qreb(ss)*B(s) - V2(s)*sum(i,Bi(s,i)*Hvap(i)) =l= MM*(1-WR(s
s));
 613
 614
 615  * Determination of the area in each column section
 616
 617  Area1(oST(s,t))..     Volumen(t) =E= Ar(s)*H(t) ;
 618  Area2(oST(s,t))..     Vol(s) =G= Volumen(t) - 1000*(1-y(t));
 619
 620  Area4(C(s))..   Ar(s) =g= PPM/sqrt(roL*rov)/0.6/329/0.8*VV(s)*100 - MM*(1-z(s));
 621
 622  Area5(C(s))..    VV(s) =g= V1(s);
 623  Area6(C(s))..    VV(s) =g= V2(s);
 624
 625  *     Estimation of the cost of trays (in $*10000)
 626
 627  Coste1(C(s))..     Cpisos(s) =e= 1/10000*(571.1 + 406.8*Ar(s) + 22.83*Ar(s)**2);
 628
 629  Coste2(oST(s,t))..    NumPisos(s) =G= NP(t) - NPmax*(1-y(t)); ;
 630  Coste3..              CostPisos =e= sum(s, Cpisos(s)*NumPisos(s))*1.2;
 631
 632  Coste4(C(s))..      CP(s) =g= (603.8*Vol(s) + 5307)/10000 - 15*(1-z(s));
 633  Coste5(C(s))..      CostColumn(s) =E= CP(s)*(2.50 + 1.72);
 634
 635
 636
 637  *_____________________________________________________________________________
          objective functions

          costs of utilities      Vapor  5.09 $/GJ
                                  Water  0.19 $/GJ

          Heat is in  KJ/mol and divided by 100 to scale,  in a calculation base of
          1 Kmol/h. Taking into account that we are feeding to the system, say 200 kmol/h
,
          assuming  8000 h/year

          The energy cost is
           Qreb*100 (KJ/mol)*200(Kmol/h)*8000(h/year) 1000(mol/kmol)*10-6(GJ/KJ)= [GJ/yea
r]

         Everything is divided by 10000 to express in tens of thousand of dollars

          zobj   makes reference to total costs
          zobj2  only takes into account the energy costs.

 657  *_____________________________________________________________________________
 658
 659  objfun..         zobj =E= 1/10000*(
 660                                  100*Ff*100*8000*1000/1e6*sum(s, 5.09*Qreb(s) + 0.19*Qco
nd(s) )
 661                                  ) +
 662                                  1*(sum(s,CostColumn(s)) + CostPisos) +
 663                                  1/10000*sum(s, 15000*W(s));
 664
 665
 666  objfun2..        zobj2 =E= 1/10000*(
```

```
667                             100*Ff*100*8000*1000/1e6*sum(s, 5.09*Qreb(s) + 0.19*Qcond(s)
)
668                             );
669
670
671
672  *=============================================================================
673
674  *        Bounds and specifications
675  *_____________________________________________________________________________
676
677  rud.lo(s,'r1') = alpha('B') + 0.01;        rud.up(s,'r1') = alpha('A') - 0.01;
678  rud.lo(s,'r2') = alpha('C') + 0.01;        rud.up(s,'r2') = alpha('B') - 0.01;
679  rud.lo(s,'r3') = alpha('D') + 0.01;        rud.up(s,'r3') = alpha('C') - 0.01;
680  rud.lo(s,'r4') = alpha('E') + 0.01;        rud.up(s,'r4') = alpha('D') - 0.01;
681
682  rud.l(s,'r1') = (alpha('A') + alpha('B'))/2;
683  rud.l(s,'r2') = (alpha('B') + alpha('C'))/2;
684  rud.l(s,'r3') = (alpha('C') + alpha('D'))/2;
685  rud.l(s,'r3') = (alpha('D') + alpha('E'))/2;
686
687
688  Qcond.lo(s)=0;           Qcond.l(s)=.3;          Qcond.up(s) = 10;
689  Qreb.lo(s)=0;            Qreb.l(s)=.4;           Qreb.up(s) = 10;
690
691
692  Ar.lo(s)=.1;             Ar.l(s)=2;               Ar.up(s)=25;
693
694  Cp.lo(s)=0;              Cp.l(s)=5;               Cp.up(s)=100;
695                                                    CostColumn.up(s)=1e7/10000;
696  V1.up(s)=20;
697  V2.up(s)=20;
698  L1.up(s)=20;
699  L2.up(s)=20;
700
701  Fi.up(s,i) = Ff*zf(i);
702  Di.up(s,i) = Ff*zf(i);
703  Bi.up(s,i) = Ff*zf(i);
704
705  F.up(s) = Ff;
706  D.up(s) = Ff;
707  B.up(s) = Ff;
708
709  V1.l(s) = 1;
710  L1.l(s) = 1;
711  V2.l(s) = 1;
712  L2.l(s) = 1;
713
714  VV.lo(s)=0;
715  VV.l(s)=3;
716  VV.up(s)=50;
717
718
719  D.l(s)=0.5;
720  B.l(s)=0.5;
721  F.l(s)=1;
722
723
724
725
726  model TCD /
727            logic1, logic2, logic3, logic4, logic5, logic6
728            logic7, logic8, logic9, logic10, logic11, logic12
```

```
 729           logic13, logic14, logic15,
 730           objfun, objfun2
 731           eq1, eq1b, eq2, eq2b, eq3, eq4, eq5, eq6a, eq6b, eq7a, eq7b,
 732           eq8, eq10, eq11, eq12, eq13,eq14, eq15, eq16,eq17, eq18,
 733           eq19, eq20, eq21, eq22, eq23, eq24, eq25, eq26, eq27,  eq28
 734           eq29,  eq30, eq31, eq32, eq33, eq34, eq35, eq36, eq37, eq38
 735           eq39, eq40, eq41, eq42, eq43, eq44, eq45
 736           uw1a, uw1b,  uw2, uw3
 737           heat5, heat6, heat7, heat8, heat9, heat10
 738           heat11, heat12, heat13, heat14
 739           Area1, Area2,  Area4, Area5, Area6
 740           Coste1, Coste2, Coste3, Coste4, Coste5
 741           /;
 742
 743  model TCD2 /TCD, logicaux, logicaux2/;
 744
 745  TCD2.nodlim = 100000;
 746
 747
 748
 749  *=============================================================================
 750
 751  ITER=1;
 752
 753  B1(s,it)$(ord(it) eq 1) = 0;
 754  N1(s,it)$(ord(it) eq 1) = 0;
 755
 756
 757  *=============================================================================
==
 758
 759  *        specifications
 760
 761  W.lo(s)=0;
 762  W.up(s)=1;
 763
 764  W.fx(s)=0;
 765
 766  z.lo(s)=0;       z.up(s)=1;
 767  z.fx(p(s))=0;
 768  W.fx('ABCDE')=0;
 769  W.fx('A')=1;
 770  W.fx('E')=1;
 771
 772  WR.lo(s)=0;      WR.up(s)=1;
 773  WC.lo(s)=0;      WC.up(s)=1;
 774
 775  Wbin.l('A')=1;
 776  Wbin.l('E')=1;
 777
 778
 779
 780  *=============================================================================
==
 781
 782
 783
 784
 785
 786
 787  * Solving strategy. First we search among all the basic configurations
 788  * but fixing all the intermediate heat exchangers (not those associated to final product
s)
```

```
 789  * to FALSE.
 790
 791  *  Then we fix the basic configuration and optimize the heat exchangers structure.
 792
 793  * The idea below that strategy is that the dominant cost tend to be the energy, and that
 794  * for a given basic configuration the differences in total cost are smaller than those
 795  * between different basic configurations.
 796
 797  * For a given basic configuration that alternative with the minimum energy consumption
 798  * is that with the maximum possible thermal couple.
 799
 800           y.lo(t)=0; y.up(t) = 1;
 801           W.fx(s)=0;
 802           W.lo(s)$(P(s)) =0;  W.up(s)$(P(s)) =1;
 803           W.fx('A')=1;  W.fx('E')=1;
 804
 805           option minlp = sbb;
 806           solve TCD using minlp minimizing zobj;
 807
 808           y.fx(t) = y.l(t);
 809           W.lo(s)=0;
 810           W.up(s)=1;
 811           W.fx('ABCDE')=0;  W.fx('A')=1;  W.fx('E')=1;
 812
 813
 814
 815          solve TCD2 using minlp minimizing zobj;
 816
 817           ITER = ITER + 1;
 818           B1(s,it)$(ord(it) = ITER) = z.l(s);
 819           N1(s,it)$(ord(it) = ITER) = 1-z.l(s);
 820
 821
 822   PARAMETERS
 823           INVESTMENT      dollars per year
 824           ENERGY          dollars per year
 825           TOTAL           dollars per year
 826           HEATREBOILER(s)        Heat load of the reboiler in kW
 827           HEATCONDENSER(s)       Heat load of the reboiler in kW
 828           DIAMETER(s)            Column (pseudo-column) diameter in m ;
 829
 830
 831           INVESTMENT =    sum(s,CostColumn.l(s)) + CostPisos.l +   1/10000*sum(s, 15000*W
.l(s))*10000;
 832           ENERGY =   1/10000*( 100*Ff*100*8000*1000/1e6*sum(s, 5.09*Qreb.l(s) + 0.19*Qcon
d.l(s) ))*10000;
 833           TOTAL = ENERGY + INVESTMENT;
 834
 835           HEATREBOILER(s)  = QReb.l(s)*100*100*Ff*1000/3600;
 836           HEATCONDENSER(s) = QCond.l(s)*100*100*Ff*1000/3600;
 837
 838           DISPLAY   TOTAL, ENERGY, INVESTMENT;
 839           DISPLAY   y.l, z.l, WC.l, WR.l, HEATREBOILER, HEATCONDENSER;
 840
 841
 842           DIAMETER(s) = sqrt(Ar.l(s)*4/3.1416)*z.l(s);
 843           DISPLAY DIAMETER, NumPisos.l;
INCLUDE    /var/www/html/interfaces/cgi-bin/thermaldis/sumres.inc
 845  ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
 846
 847  *  sumres.inc  file for the creation of the Summary of Results and
 848  *  data for the graphic display of solution.
 849
```

```
 850  ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
 851
 852
 853
 854  FIlE RES1 /"../../thermaldis/output.html"/
 855  PUT RES1 "<html><head><title>OUTPUT</title>"/;
 856  *PUT RES1 '<meta http-equiv="refresh" content="1000";url=http://newton.cheme.cmu.edu/int
erfaces/thermaldis/output.html">'/;
 857  *PUT RES1 '<script type="text/javascript">'/;
 858  *PUT RES1 "function reloadPage()"/;
 859  *PUT RES1 " {"/;
 860  *PUT RES1 "  window.location.reload()"/;
 861  *PUT RES1 "  }"/;
 862  *PUT RES1 "</script>"/;
 863  PUT RES1 '<style type="text/css">'/;
 864  PUT RES1 "      HR {"/;
 865  PUT RES1 "              font-color: #800000;"/;
 866  PUT RES1 "      }"/;
 867  PUT RES1 "      TD.ref {"/;
 868  PUT RES1 "              border : thick outset #FFFF130;"/;
 869  PUT RES1 "              background-color : #C0C0C0;"/;
 870  PUT RES1 "              padding-left : 1ex;"/;
 871  PUT RES1 "              width : 50%;"/;
 872  PUT RES1 "              font-size : small;"/;
 873  PUT RES1 "              font-color: #800000;"/;
 874  PUT RES1 "              padding-top : 6px;"/;
 875  PUT RES1 "              padding-right : 6px;"/;
 876  PUT RES1 "              padding-bottom : 6px;"/;
 877  PUT RES1 "              padding-left : 6px;"/;
 878  PUT RES1 "              text-align : 1em;"/;
 879  PUT RES1 "              vertical-align : top;"/;
 880  PUT RES1 "              font-weight : bold;"/;
 881  PUT RES1 "      }"/;
 882  PUT RES1 "</style>"/;
 883
 884  PUT RES1 "</head><body alink=#800000 link=#800000>"/;
 885  PUT RES1 " <br />"//;
 886  PUT RES1 " <h3><b>THERMAL-DIST Interface</b></h3></hr><hr></hr>"//;
 887  PUT RES1 "<font color=#353535>  Optimal Separation Sequences based on Thermally Coupled
Distillation.</font><br/>"///;
 888  *PUT RES1 '<input type="button" value="Reload page" onclick="reloadPage()" />'/;
 889  PUT RES1 "<table  align=center  border =4 bordercolor=#6E6E6E width=95%><th colspan =10
bgcolor=#922414> <font  color=#FFFFFF> DATA  </font></th>"//;
 890  *PUT RES1 "<tr></tr> "/;
 891  *PUT RES1 "<td> "/;
 892
 893
 894  PUT RES1 "<tr><td> "/;
 895  PUT RES1 "<table  align=center  border =0 >"///;
 896  PUT RES1 "<tr><td> "/;
 897
 898  PUT RES1 "</table>"/;
 899
 900  PUT RES1 "<table align=center  border =1 bordercolor=#800000 width=90%><th colspan =8 bg
color=#C0C0C0>  Parameters </th>"/;
 901  PUT RES1 "<tr><td>";
 902  loop (ii,
 903  PUT RES1 "<td bgcolor=#E0E0F8><center>" ii.tl:20:0 /;
 904  );
 905  PUT RES1 "<tr><td>";
 906  loop (i,
 907  PUT RES1 "<td bgcolor=#E0E0F8><center>" i.tl:20:0 /;
 908  );
```

```
 909
 910  PUT RES1 "<tr><td bgcolor=#FEFDCD>Relative Volatility* ";
 911  loop (i,
 912  PUT RES1 "<td><center>" alpha(i) /;
 913  );
 914  PUT RES1 "<tr><td bgcolor=#FEFDCD> Feed mole fraction ";
 915  loop (i,
 916  PUT RES1 "<td><center>"  zf(i) /;
 917  );
 918  PUT RES1 "<tr><td bgcolor=#FEFDCD> Molecular weight - g/mol ";
 919  loop (i,
 920  PUT RES1 "<td><center>" PM(i) /;
 921  );
 922  PUT RES1 "<tr><td bgcolor=#FEFDCD> Vaporization enthalpy - kJ/mol ";
 923  loop (i,
 924  PUT RES1 "<td><center>" Hvap(i) /;
 925  );
 926  PUT RES1 "</table>"/;
 927  loop (ii,
 928  PUT$(ord(ii) eq 5) RES1 "<font size=2px><center>* Relative volatility of component <i>i<
/i> to the less volatile component ("ii.tl:20:0")."/;
 929  );
 930  PUT RES1 "<table align=center  border =1 bordercolor=#800000 width=50%><th colspan =8 bg
color=#C0C0C0> </th>"/;
 931  PUT RES1 "<p></p><tr><td>";
 932  PUT RES1 "<tr><td bgcolor=#FEFDCD>Total Feed Flow - Kmol/h <td><center> 200 "/;
 933  PUT RES1 "<tr><td bgcolor=#FEFDCD>Nominal pressure - atm <td><center>"Pr/;
 934  *PUT RES1 "<tr><td bgcolor=#FEFDCD>Minimum number of trays in task t <td>"NPmin(t).l/;
 935  PUT RES1 "<tr><td bgcolor=#FEFDCD> Maximum number of trays <td><center>"NPmax:4:0 /;
 936  *loop (t,
 937  *PUT RES1 "<tr><td bgcolor=#FEFDCD>Actual number of trays <td><center>"NP(t):4:0/;
 938  *);
 939  *PUT RES1 "<tr><td bgcolor=#FEFDCD>Length of the column t <td><center>"H(t).l/;
 940  PUT RES1 "<tr><td bgcolor=#FEFDCD>Molecular weight - g/mol <td><center>"PPM /;
 941  *PUT RES1 "<tr><td bgcolor=#FEFDCD>Liquid density assumed constant - kg/m<sup>3</sup> <t
d><center>"roL/;
 942  *PUT RES1 "<tr><td bgcolor=#FEFDCD>Vapor density calculated in feed tray <td><center>"ro
v/;
 943  PUT RES1 "<tr><td bgcolor=#FEFDCD>Recovery of each component in a column <td><center>"re
c/;
 944  PUT RES1 "<tr><td bgcolor=#FEFDCD>Feed temperature - &#176; C <td><center>"Tf/;
 945  PUT RES1 "<tr><td bgcolor=#FEFDCD>Cost of Steam - $/GJ <sup> &#8224;</sup>  <td><center>
 5.09 "/;
 946  PUT RES1 "<tr><td bgcolor=#FEFDCD>Cost of Water - $/GJ <sup> &#8224;</sup> <td><center>
0.19 "/;
 947
 948  PUT RES1 "</table>"/;
 949  PUT RES1 "<font size=2px><center> &#8224; Assumed Operation time: 8000 h/yr."/;
 950
 951  PUT RES1 "</table><p></p>"/;
 952
 953
 954
 955  PUT RES1 "<table align=center  border =4 bordercolor=#6E6E6E bgcolor=#FFFFFF width=95%><
th colspan =18 bgcolor=#922414> <font color=#FFFFFF > RESULTS   </font>"///;
 956
 957  PUT RES1 "<tr><tr><td>"/;
 958
 959  PUT RES1 "<table align=center  border =1 bordercolor=#800000 width=40%><th colspan =8 bg
color=#C0C0C0>  Costs ($/yr)  </th>"/;
 960  PUT RES1 "<tr> "/;
 961  PUT RES1 "<td bgcolor=#E0E0F8 align=center> Total Energy Cost <td align=right>" energy"<
tr>"/;
```

```
 962  PUT RES1 "<td bgcolor=#E0E0F8 align=center> Total Investment Cost <td align=right>" inve
stment"<tr>"/;
 963  PUT RES1 "<td bgcolor=#FEFDCD align=center> Total Cost <td align=right>" Total"<tr>"/;
 964  PUT RES1 "</table><p></p>"/;
 965
 966
 967  PUT RES1 "<table align=center  border =1 bordercolor=#800000 width=90%><th colspan =18 b
gcolor=#C0C0C0> Specifications  </th>"/;
 968  PUT RES1 "<tr> "/;
 969  PUT RES1 "<td bgcolor=#E0E0F8> State exists*  ";
 970  loop (s,
 971  PUT$(z.l(s) ne 0) RES1 "<td bgcolor=#FEFDCD><center>" s.tl"<td>"/;
 972  );
 973  PUT RES1 "<tr> "//;
 974  PUT RES1 "<td bgcolor=#E0E0F8> Number of trays";
 975  loop (s,
 976  PUT$(NumPisos.l(s) ne 0) RES1 "<td><center>"NumPisos.l(s):4:0 "<td>"/;
 977  );
 978  PUT RES1 "<tr> "/;
 979  PUT RES1 "<td bgcolor=#E0E0F8> Column (pseudo-column) diameter - m";
 980  loop (s,
 981  PUT$(DIAMETER(s) ne 0) RES1 "<td><center>"DIAMETER(s):6:2 "<td>"/;
 982  );
 983  PUT RES1 "<tr> "/;
 984  PUT RES1 "</table>"//;
 985  PUT RES1 "<table align=center  border =1 bordercolor=#800000 width=90%><th colspan =15 b
gcolor=#C0C0C0> </th>"/;
 986  PUT RES1 "<tr> "/;
 987  PUT RES1 "<td bgcolor=#E0E0F8 > Heat load of the Reboiler  - kW &#8224; ";
 988  loop (s,
 989  PUT$(HEATREBOILER(s) ne 0) RES1 "<td><center> ("s.tl") " HEATREBOILER(s):6:0 "<td>"/;
 990
 991  );
 992  PUT RES1 "<tr> "/;
 993  PUT RES1 "<td bgcolor=#E0E0F8 > Heat load of the Condenser - kW &#8224;";
 994  loop (s,
 995  PUT$(HEATCONDENSER(s) ne 0) RES1 "<td><center> ("s.tl") "HEATCONDENSER(s):6:0 "<td>"/;
 996  );
 997
 998  PUT RES1 "<tr> "/;
 999  PUT RES1 "<td bgcolor=#E0E0F8 > Separation task exists";
INCLUDE    /var/www/html/interfaces/cgi-bin/thermaldis/task.inc
1001
1002  PUT$(y.l('t1') eq 1) RES1 "<td><center> A/BCDE<td>"/;
1003  PUT$(y.l('t2') eq 1) RES1 "<td><center> AB/CDE<td>"/;
1004  PUT$(y.l('t3') eq 1) RES1 "<td><center> AB/BCDE<td>"/;
1005  PUT$(y.l('t4') eq 1) RES1 "<td><center> ABC/BCDE<td>"/;
1006  PUT$(y.l('t5') eq 1) RES1 "<td><center> ABC/CDE<td>"/;
1007  PUT$(y.l('t6') eq 1) RES1 "<td><center> ABC/DE<td>"/;
1008  PUT$(y.l('t7') eq 1) RES1 "<td><center> ABCD/BCDE<td>"/;
1009  PUT$(y.l('t8') eq 1) RES1 "<td><center> ABCD/CDE<td>"/;
1010  PUT$(y.l('t9') eq 1) RES1 "<td><center> ABCD/DE<td>"/;
1011  PUT$(y.l('t10') eq 1) RES1 "<td><center> ABCD/E<td>"/;
1012  PUT$(y.l('t11') eq 1) RES1 "<td><center> A/BCD<td>"/;
1013  PUT$(y.l('t12') eq 1) RES1 "<td><center> AB/BCD<td>"/;
1014  PUT$(y.l('t13') eq 1) RES1 "<td><center> AB/CD<td>"/;
1015  PUT$(y.l('t14') eq 1) RES1 "<td><center> ABC/BCD<td>"/;
1016  PUT$(y.l('t15') eq 1) RES1 "<td><center> ABC/CD<td>"/;
1017  PUT$(y.l('t16') eq 1) RES1 "<td><center> ABC/D<td>"/;
1018  PUT$(y.l('t17') eq 1) RES1 "<td><center> B/CDE<td>"/;
1019  PUT$(y.l('t18') eq 1) RES1 "<td><center> BC/CDE<td>"/;
1020  PUT$(y.l('t19') eq 1) RES1 "<td><center> BC/DE<td>"/;
1021  PUT$(y.l('t20') eq 1) RES1 "<td><center> BCD/CDE<td>"/;
```

```
1022  PUT$(y.l('t21') eq 1) RES1 "<td><center> BCD/DE <td>"/;
1023  PUT$(y.l('t22') eq 1) RES1 "<td><center> BCD/E<td>"/;
1024  PUT$(y.l('t23') eq 1) RES1 "<td><center> A/BC<td>"/;
1025  PUT$(y.l('t24') eq 1) RES1 "<td><center> AB/BC<td>"/;
1026  PUT$(y.l('t25') eq 1) RES1 "<td><center> AB/C<td>"/;
1027  PUT$(y.l('t26') eq 1) RES1 "<td><center> B/CD<td>"/;
1028  PUT$(y.l('t27') eq 1) RES1 "<td><center> BC/CD<td>"/;
1029  PUT$(y.l('t28') eq 1) RES1 "<td><center> BC/D<td>"/;
1030  PUT$(y.l('t29') eq 1) RES1 "<td><center> C/DE<td>"/;
1031  PUT$(y.l('t30') eq 1) RES1 "<td><center> CD/DE<td>"/;
1032  PUT$(y.l('t31') eq 1) RES1 "<td><center> CD/E<td>"/;
1033  PUT$(y.l('t32') eq 1) RES1 "<td><center> A/B<td>"/;
1034  PUT$(y.l('t33') eq 1) RES1 "<td><center> B/C<td>"/;
1035  PUT$(y.l('t34') eq 1) RES1 "<td><center> C/D<td>"/;
1036  PUT$(y.l('t35') eq 1) RES1 "<td><center> D/E<td>"/;
1037  PUT RES1 "<tr> "//;
1038  PUT RES1 "</table>"/;
1039  PUT RES1 "<font size=2px>         * A,B,C,D,E states always exist.<b
r/>"/;
1040  PUT RES1 "<font size=2px>         &#8224; Value between parentheses
represents the state to which reboiler/condenser is associated."/;
1041  PUT RES1 "<p></p>"/;
1042
1043  PUT RES1 "<table align=center  border =1 bordercolor=#800000 width=90%><th colspan =8 bg
color=#C0C0C0> Optimal Solution </th>"/;
1044
1045  PUT RES1 "<tr><td> "/;
1046
1047
INCLUDE    /var/www/html/interfaces/cgi-bin/thermaldis/tac.inc
1049  PUT$(tac eq 1) RES1 '<img src="http://newton.cheme.cmu.edu/interfaces/thermaldis/tac1.pn
g" alt="TAC1" />'/;
1050  PUT$(tac eq 2) RES1 '<img src="http://newton.cheme.cmu.edu/interfaces/thermaldis/tac2.pn
g" alt="TAC2" />'/;
1051  PUT$(tac eq 3) RES1 '<img src="http://newton.cheme.cmu.edu/interfaces/thermaldis/tac3.pn
g" alt="TAC3" />'/;
1052
1053  PUT RES1 "</table>"/;
1054
1055
1056
1057
1058  PUT RES1 "</table>"/;
1059
1060
INCLUDE    /var/www/html/interfaces/cgi-bin/thermaldis/buttons.inc
1062  *PUT RES1 '<br><table align=center><td class="ref"><A HREF="./../cgi-bin/flexnet/graph.c
gi" target=new_window>SEE NETWORK</A>'/;
1063  PUT RES1 '<table align=center>'/;
1064  PUT RES1 '<td class="ref"><a href="model.pdf" target=new_window><center>GAMS LIST FILE</
center></a>';
1065  PUT RES1 "</table></body></html>"/;

**** LIST OF STRAY NAMES - CHECK DECLARATIONS FOR SPURIOUS COMMAS
**** STRAY NAME Area3 OF TYPE EQU
```


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

Include File Summary

SEQ	GLOBAL	TYPE	PARENT	LOCAL	FILENAME
1	1	INPUT	0	0	/var/www/html/interfaces/cgi-bin/thermaldis/model.gm

```
s
     2        1 INCLUDE        1       1  ./var/www/html/interfaces/cgi-bin/thermaldis/ex1.dat
     3        2 INCLUDE        2       1  ../var/www/html/interfaces/cgi-bin/thermaldis/preset
.inc
     4      420 INCLUDE        1       2  ./var/www/html/interfaces/cgi-bin/thermaldis/model.i
nc
     5      844 INCLUDE        1       3  ./var/www/html/interfaces/cgi-bin/thermaldis/sumres.
inc
     6     1000 INCLUDE        5     156  ../var/www/html/interfaces/cgi-bin/thermaldis/task.i
nc
     7     1048 INCLUDE        5     168  ../var/www/html/interfaces/cgi-bin/thermaldis/tac.in
c
     8     1061 INCLUDE        5     178  ../var/www/html/interfaces/cgi-bin/thermaldis/button
s.inc


COMPILATION TIME     =        0.013 SECONDS      3 MB  38.2.1 96226ea8 LEX-LEG
GAMS 38.2.1  96226ea8 Feb 19, 2022          LEX-LEG x86 64bit/Linux - 04/25/25 04:51:21 Page 3
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 TCD Using MINLP From line 806


MODEL STATISTICS

BLOCKS OF EQUATIONS          89     SINGLE EQUATIONS        1,296
BLOCKS OF VARIABLES          29     SINGLE VARIABLES          483  10 projected
NON ZERO ELEMENTS         4,833     NON LINEAR N-Z            840
CODE LENGTH               3,368     CONSTANT POOL              30     DISCRETE VARIABLES
   35


GENERATION TIME      =        0.016 SECONDS      4 MB  38.2.1 96226ea8 LEX-LEG
GAMS 38.2.1  96226ea8 Feb 19, 2022          LEX-LEG x86 64bit/Linux - 04/25/25 04:51:21 Page 4
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 TCD Using MINLP From line 806


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

     MODEL   TCD                 OBJECTIVE  zobj
     TYPE    MINLP               DIRECTION  MINIMIZE
     SOLVER  SBB                 FROM LINE  806

**** SOLVER STATUS     1 Normal Completion
**** MODEL STATUS      8 Integer Solution
**** OBJECTIVE VALUE               419.8011

 RESOURCE USAGE, LIMIT         37.142  10000000.000
 ITERATION COUNT, LIMIT     42198     100000000
 EVALUATION ERRORS              0             0


    C O N O P T 3   version 3.17K
    Copyright (C)   ARKI Consulting and Development A/S
                    Bagsvaerdvej 246 A
                    DK-2880 Bagsvaerd, Denmark


    The model has 483 variables and 1296 constraints
    with 4833 Jacobian elements, 840 of which are nonlinear.
    The Hessian of the Lagrangian has 30 elements on the diagonal,
    435 elements below the diagonal, and 270 nonlinear variables.
```

```
                  Pre-triangular equations:   10
                  Post-triangular equations:  145
                  Definitional equations:     53


 ** Optimal solution. Reduced gradient less than tolerance.


 CONOPT time Total                              0.112 seconds
   of which: Function evaluations               0.007 =  6.3%
             1st Derivative evaluations         0.006 =  5.4%


 ^^^ Detailed root node information above.

 Integer solution
 Statistics:
    B&B nodes     :               389
    Ignored nodes :                 1
    MIP solution  :        419.801136 found in node 359
    Best possible :        419.801136
    Absolute gap  :          0.000000     optca :  0.000000
    Relative gap  :          0.000000     optcr :  0.000000
    Model Status  :                 8
    Solver Status :                 1

---- EQU logic1

             LOWER          LEVEL          UPPER         MARGINAL

ABCDE        -INF            1.0000         1.0000    -55708.7632
ABCD         -INF            1.0000         1.0000         EPS
BCDE         -INF            1.0000         1.0000    -55708.7632
ABC          -INF      3.307092E-22         1.0000          .
BCD          -INF            1.0000         1.0000          .
CDE          -INF             .             1.0000          .
AB           -INF             .             1.0000          .
BC           -INF             .             1.0000          .
CD           -INF            1.0000         1.0000          .
DE           -INF            1.0000         1.0000          .

---- EQU logic2

            LOWER          LEVEL          UPPER         MARGINAL

ABCD        -INF            1.0000         1.0000          .
ABC         -INF      3.307092E-22         1.0000          .
BCD         -INF            1.0000         1.0000          .
AB          -INF      3.307092E-22         1.0000          .
BC          -INF             .             1.0000          .
CD          -INF             .             1.0000          .

---- EQU logic3

            LOWER          LEVEL          UPPER         MARGINAL

BCDE        -INF            1.0000         1.0000          .
BCD         -INF            1.0000         1.0000          .
CDE         -INF      3.307092E-22         1.0000          .
BC          -INF      3.307092E-22         1.0000          .
CD          -INF            1.0000         1.0000          .
DE          -INF            1.0000         1.0000    -1545.8925
```

---- EQU logic4

	LOWER	LEVEL	UPPER	MARGINAL
A	1.0000	1.0000	+INF	.
B	1.0000	1.0000	+INF	21624.4660
C	1.0000	1.0000	+INF	.
D	1.0000	2.0000	+INF	.
E	1.0000	1.0000	+INF	54167.1046

---- EQU logic5

	LOWER	LEVEL	UPPER	MARGINAL
A	-INF	1.0000	1.0000	-21855.4660
B	-INF	1.0000	1.0000	.
C	-INF	1.0000	1.0000	.
D	-INF	1.0000	1.0000	.

---- EQU logic6

	LOWER	LEVEL	UPPER	MARGINAL
B	-INF	.	1.0000	.
C	-INF	.	1.0000	.
D	-INF	1.0000	1.0000	.
E	-INF	1.0000	1.0000	.

---- EQU logic7

	LOWER	LEVEL	UPPER	MARGINAL
A	1.0000	2.0000	+INF	.
B	1.0000	2.0000	+INF	.
C	1.0000	2.0000	+INF	.
D	1.0000	1.0000	+INF	.
E	1.0000	1.0000	+INF	.

---- EQU logic8

	LOWER	LEVEL	UPPER	MARGINAL
A	1.0000	1.0000	+INF	.
B	1.0000	1.0000	+INF	77.5000
C	1.0000	1.0000	+INF	153.5000
D	1.0000	1.0000	+INF	.
E	1.0000	2.0000	+INF	.

---- EQU logic9

	LOWER	LEVEL	UPPER	MARGINAL
B.t17.t32	-2.0000	-1.0000	+INF	.
B.t26.t32	-2.0000	-2.0000	+INF	.
B.t33.t32	-2.0000	-1.0000	+INF	.
C.t29.t25	-2.0000	-1.0000	+INF	.
C.t29.t33	-2.0000	-1.0000	+INF	.
C.t34.t25	-2.0000	-2.0000	+INF	.
C.t34.t33	-2.0000	-2.0000	+INF	.
D.t35.t16	-2.0000	-1.0000	+INF	.
D.t35.t28	-2.0000	-1.0000	+INF	.
D.t35.t34	-2.0000	-2.0000	+INF	217.8968

---- EQU logic10

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	1.0000	+INF	.
BCDE	.	1.0000	+INF	.
ABC	.	.	+INF	.
BCD	.	2.0000	+INF	.
CDE	.	.	+INF	.
AB	.	.	+INF	.
BC	.	.	+INF	.
CD	.	1.0000	+INF	.
DE	.	1.0000	+INF	.

---- EQU logic11

	LOWER	LEVEL	UPPER	MARGINAL
BCD.t11.t20	-2.0000	-1.0000	+INF	.
BCD.t11.t21	-2.0000	-2.0000	+INF	.
BCD.t11.t22	-2.0000	-1.0000	+INF	.
BCD.t12.t20	-2.0000	.	+INF	.
BCD.t12.t21	-2.0000	-1.0000	+INF	.
BCD.t12.t22	-2.0000	.	+INF	.
BCD.t14.t20	-2.0000	.	+INF	.
BCD.t14.t21	-2.0000	-1.0000	+INF	.
BCD.t14.t22	-2.0000	.	+INF	.
BC .t18.t23	-2.0000	.	+INF	.
BC .t18.t24	-2.0000	-3.30709E-22	+INF	.
BC .t19.t23	-2.0000	.	+INF	.
BC .t19.t24	-2.0000	-3.30709E-22	+INF	.
BC .t27.t23	-2.0000	.	+INF	.
BC .t27.t24	-2.0000	-3.30709E-22	+INF	.
BC .t28.t23	-2.0000	.	+INF	.
BC .t28.t24	-2.0000	-3.30709E-22	+INF	.
CD .t30.t13	-2.0000	.	+INF	.
CD .t30.t15	-2.0000	.	+INF	.
CD .t30.t26	-2.0000	-1.0000	+INF	.
CD .t30.t27	-2.0000	.	+INF	.
CD .t31.t13	-2.0000	.	+INF	.
CD .t31.t15	-2.0000	.	+INF	.
CD .t31.t26	-2.0000	-1.0000	+INF	.
CD .t31.t27	-2.0000	.	+INF	.

---- EQU logic12

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.t7	.	.	+INF	.
ABCD.t8	.	1.0000	+INF	.
ABCD.t9	.	1.0000	+INF	.
ABCD.t10	.	1.0000	+INF	.
BCDE.t1	.	1.0000	+INF	.
BCDE.t2	.	1.0000	+INF	.
BCDE.t4	.	1.0000	+INF	.
BCDE.t7	.	.	+INF	.
ABC .t4	.	.	+INF	.
ABC .t5	.	.	+INF	.
ABC .t6	.	.	+INF	.
ABC .t14	.	.	+INF	.
ABC .t15	.	.	+INF	.
ABC .t16	.	.	+INF	EPS
BCD .t11	.	.	+INF	.

BCD .t12	.	1.0000	+INF	.
BCD .t14	.	1.0000	+INF	.
BCD .t20	.	1.0000	+INF	.
BCD .t21	.	.	+INF	.
BCD .t22	.	1.0000	+INF	.
CDE .t3	.	.	+INF	.
CDE .t5	.	.	+INF	.
CDE .t8	.	.	+INF	.
CDE .t17	.	.	+INF	.
CDE .t18	.	.	+INF	.
CDE .t20	.	.	+INF	.
AB .t2	.	.	+INF	.
AB .t3	.	.	+INF	.
AB .t12	.	.	+INF	.
AB .t13	.	.	+INF	.
AB .t24	.	.	+INF	.
AB .t25	.	.	+INF	153.5000
BC .t18	.	.	+INF	EPS
BC .t19	.	.	+INF	.
BC .t23	.	.	+INF	.
BC .t24	.	.	+INF	.
BC .t27	.	.	+INF	EPS
BC .t28	.	.	+INF	EPS
CD .t13	.	1.0000	+INF	.
CD .t15	.	1.0000	+INF	.
CD .t26	.	.	+INF	13818.9556
CD .t27	.	1.0000	+INF	.
CD .t30	.	1.0000	+INF	.
CD .t31	.	1.0000	+INF	.
DE .t6	.	1.0000	+INF	.
DE .t9	.	1.0000	+INF	.
DE .t19	.	1.0000	+INF	.
DE .t21	.	.	+INF	.
DE .t29	.	1.0000	+INF	.
DE .t30	.	1.0000	+INF	.

---- EQU logic13

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.t11	.	.	+INF	.
ABCD.t12	.	1.0000	+INF	.
ABCD.t13	.	1.0000	+INF	.
ABCD.t14	.	1.0000	+INF	.
ABCD.t15	.	1.0000	+INF	.
ABCD.t16	.	1.0000	+INF	.
BCDE.t17	.	1.0000	+INF	.
BCDE.t18	.	1.0000	+INF	.
BCDE.t19	.	1.0000	+INF	.
BCDE.t20	.	1.0000	+INF	.
BCDE.t21	.	.	+INF	.
BCDE.t22	.	1.0000	+INF	.
ABC .t23	.	.	+INF	.
ABC .t24	.	.	+INF	.
ABC .t25	.	.	+INF	EPS
BCD .t26	.	1.0000	+INF	.
BCD .t27	.	2.0000	+INF	.
BCD .t28	.	2.0000	+INF	.
CDE .t29	.	.	+INF	.
CDE .t30	.	.	+INF	.
CDE .t31	.	.	+INF	55708.7632
AB .t32	.	.	+INF	EPS
BC .t33	.	.	+INF	.

CD .t34	.	.	+INF	.
DE .t35	.	.	+INF	.

---- EQU logic14

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1	.	1.0000	+INF	.
ABCDE.t2	.	1.0000	+INF	.
ABCDE.t3	.	1.0000	+INF	.
ABCDE.t4	.	1.0000	+INF	.
ABCDE.t5	.	1.0000	+INF	.
ABCDE.t6	.	1.0000	+INF	.
ABCDE.t7	.	.	+INF	18069.8293
ABCDE.t8	.	1.0000	+INF	.
ABCDE.t9	.	1.0000	+INF	.
ABCDE.t10	.	1.0000	+INF	.
ABCD .t11	.	.	+INF	4792.5003
ABCD .t12	.	1.0000	+INF	.
ABCD .t13	.	1.0000	+INF	.
ABCD .t14	.	1.0000	+INF	.
ABCD .t15	.	1.0000	+INF	.
ABCD .t16	.	1.0000	+INF	.
BCDE .t17	.	1.0000	+INF	.
BCDE .t18	.	1.0000	+INF	.
BCDE .t19	.	1.0000	+INF	.
BCDE .t20	.	1.0000	+INF	.
BCDE .t21	.	.	+INF	22544.5411
BCDE .t22	.	1.0000	+INF	.
ABC .t23	.	.	+INF	.
ABC .t24	.	.	+INF	.
ABC .t25	.	.	+INF	.
BCD .t26	.	.	+INF	7340.2267
BCD .t27	.	1.0000	+INF	.
BCD .t28	.	1.0000	+INF	.
CDE .t29	.	.	+INF	.
CDE .t30	.	.	+INF	.
CDE .t31	.	.	+INF	.
AB .t32	.	.	+INF	.
BC .t33	.	.	+INF	.
CD .t34	.	.	+INF	12865.0761
DE .t35	.	.	+INF	48452.5086

---- EQU logic15

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	+INF	.
ABCD	.	.	+INF	.
BCDE	.	.	+INF	.
ABC	.	.	+INF	EPS
BCD	.	.	+INF	.
CDE	.	.	+INF	1545.8925
AB	.	.	+INF	.
BC	.	.	+INF	1.4932
CD	.	.	+INF	.
DE	.	.	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU objfun	.	.	.	1.0000
---- EQU objfun2	.	.	.	EPS

---- EQU eq1

	LOWER	LEVEL	UPPER	MARGINAL
A.ABCDE	0.6000	0.6000	0.6000	86.5112
B.ABCDE	0.4000	0.4000	0.4000	107.3394
C.ABCDE	0.2000	0.2000	0.2000	245.4845
D.ABCDE	0.4000	0.4000	0.4000	429.7210
E.ABCDE	0.4000	0.4000	0.4000	378.5162

---- EQU eq1b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	50.9435

---- EQU eq2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	-INF	2.0000	2.0000	.
ABCDE.B	-INF	2.0000	2.0000	-105.2509
ABCDE.C	-INF	2.0000	2.0000	-244.5564
ABCDE.D	-INF	2.0000	2.0000	-428.9933
ABCDE.E	-INF	2.0000	2.0000	-378.0957
ABCD .A	-INF	2.0000	2.0000	.
ABCD .B	-INF	2.0000	2.0000	-5.5823
ABCD .C	-INF	2.0000	2.0000	-52.1671
ABCD .D	-INF	2.0000	2.0000	.
ABCD .E	-INF	2.0000	2.0000	.
BCDE .A	-INF	2.0000	2.0000	.
BCDE .B	-INF	2.0000	2.0000	.
BCDE .C	-INF	2.0000	2.0000	.
BCDE .D	-INF	2.0000	2.0000	-433.5499
BCDE .E	-INF	2.0000	2.0000	-370.2771
ABC .A	-INF	.	2.0000	.
ABC .B	-INF	-2.06144E-21	2.0000	.
ABC .C	-INF	-2.06144E-21	2.0000	.
ABC .D	-INF	-2.06144E-21	2.0000	.
ABC .E	-INF	-2.06144E-21	2.0000	.
BCD .A	-INF	2.0000	2.0000	.
BCD .B	-INF	2.0000	2.0000	.
BCD .C	-INF	2.0000	2.0000	-52.1671
BCD .D	-INF	2.0000	2.0000	.
BCD .E	-INF	2.0000	2.0000	.
CDE .A	-INF	.	2.0000	.
CDE .B	-INF	.	2.0000	.
CDE .C	-INF	.	2.0000	.
CDE .D	-INF	.	2.0000	.
CDE .E	-INF	.	2.0000	.
AB .A	-INF	.	2.0000	.
AB .B	-INF	5.445709E-21	2.0000	.
AB .C	-INF	5.445709E-21	2.0000	.
AB .D	-INF	5.445709E-21	2.0000	.
AB .E	-INF	5.445709E-21	2.0000	.
BC .A	-INF	.	2.0000	.
BC .B	-INF	.	2.0000	.
BC .C	-INF	.	2.0000	.
BC .D	-INF	.	2.0000	.
BC .E	-INF	.	2.0000	.
CD .A	-INF	2.0000	2.0000	.
CD .B	-INF	2.0000	2.0000	.
CD .C	-INF	2.0000	2.0000	.

CD	.D	-INF	2.0000	2.0000	-2.0235
CD	.E	-INF	2.0000	2.0000	-0.6859
DE	.A	-INF	2.0000	2.0000	.
DE	.B	-INF	2.0000	2.0000	.
DE	.C	-INF	2.0000	2.0000	.
DE	.D	-INF	2.0000	2.0000	.
DE	.E	-INF	2.0000	2.0000	-1151.3558

---- EQU eq2b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	-2.0000	-2.0000	+INF	8.7211
ABCDE.B	-2.0000	-2.0000	+INF	.
ABCDE.C	-2.0000	-2.0000	+INF	.
ABCDE.D	-2.0000	-2.0000	+INF	.
ABCDE.E	-2.0000	-2.0000	+INF	.
ABCD .A	-2.0000	-2.0000	+INF	.
ABCD .B	-2.0000	-2.0000	+INF	.
ABCD .C	-2.0000	-2.0000	+INF	.
ABCD .D	-2.0000	-2.0000	+INF	14.5520
ABCD .E	-2.0000	-2.0000	+INF	17.2131
BCDE .A	-2.0000	-2.0000	+INF	7.8879
BCDE .B	-2.0000	-2.0000	+INF	9.6934
BCDE .C	-2.0000	-2.0000	+INF	18.7110
BCDE .D	-2.0000	-2.0000	+INF	.
BCDE .E	-2.0000	-2.0000	+INF	.
ABC .A	-2.0000	.	+INF	.
ABC .B	-2.0000	-3.38427E-21	+INF	.
ABC .C	-2.0000	-3.38427E-21	+INF	.
ABC .D	-2.0000	-3.38427E-21	+INF	.
ABC .E	-2.0000	-3.38427E-21	+INF	.
BCD .A	-2.0000	-2.0000	+INF	.
BCD .B	-2.0000	-2.0000	+INF	.
BCD .C	-2.0000	-2.0000	+INF	.
BCD .D	-2.0000	-2.0000	+INF	14.5520
BCD .E	-2.0000	-2.0000	+INF	17.2131
CDE .A	-2.0000	.	+INF	.
CDE .B	-2.0000	.	+INF	.
CDE .C	-2.0000	.	+INF	.
CDE .D	-2.0000	.	+INF	.
CDE .E	-2.0000	.	+INF	.
AB .A	-2.0000	.	+INF	.
AB .B	-2.0000	.	+INF	.
AB .C	-2.0000	.	+INF	.
AB .D	-2.0000	.	+INF	.
AB .E	-2.0000	.	+INF	.
BC .A	-2.0000	.	+INF	.
BC .B	-2.0000	.	+INF	.
BC .C	-2.0000	.	+INF	.
BC .D	-2.0000	.	+INF	.
BC .E	-2.0000	.	+INF	.
CD .A	-2.0000	-2.0000	+INF	.
CD .B	-2.0000	-2.0000	+INF	.
CD .C	-2.0000	-2.0000	+INF	0.7293
CD .D	-2.0000	-2.0000	+INF	.
CD .E	-2.0000	-2.0000	+INF	.
DE .A	-2.0000	-2.0000	+INF	22.2661
DE .B	-2.0000	-2.0000	+INF	21.6587
DE .C	-2.0000	-2.0000	+INF	117.9124
DE .D	-2.0000	-2.0000	+INF	432.1245
DE .E	-2.0000	-2.0000	+INF	.

---- EQU eq3

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	EPS
ABCD	.	.	.	EPS
BCDE	.	.	.	EPS
ABC	.	.	.	EPS
BCD	.	.	.	EPS
CDE	.	.	.	EPS
AB	.	.	.	EPS
BC	.	.	.	EPS
CD	.	.	.	EPS
DE	.	.	.	EPS

---- EQU eq4

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	EPS
ABCD	.	.	.	EPS
BCDE	.	.	.	EPS
ABC	.	.	.	EPS
BCD	.	.	.	EPS
CDE	.	.	.	-0.3798
AB	.	.	.	-2.7339
BC	.	.	.	-5.1947
CD	.	.	.	54.0814
DE	.	.	.	-21.6587

---- EQU eq5

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	EPS
ABCD	.	.	.	EPS
BCDE	.	.	.	EPS
ABC	.	.	.	EPS
BCD	.	.	.	-21.9397
CDE	.	.	.	EPS
AB	.	.	.	EPS
BC	.	.	.	EPS
CD	.	.	.	0.2810
DE	.	.	.	-231.7108

---- EQU eq6a

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-INF	10.0000	10.0000	.
ABCD	-INF	10.0000	10.0000	EPS
BCDE	-INF	10.0000	10.0000	.
ABC	-INF	1.110223E-16	10.0000	.
BCD	-INF	10.0000	10.0000	.
CDE	-INF	.	10.0000	.
AB	-INF	1.110223E-16	10.0000	.
BC	-INF	1.110223E-16	10.0000	.
CD	-INF	10.0000	10.0000	-21.9397
DE	-INF	10.0000	10.0000	.

---- EQU eq6b

	LOWER	LEVEL	UPPER	MARGINAL

ABCDE	-10.0000	-10.0000	+INF	.
ABCD	-10.0000	-10.0000	+INF	.
BCDE	-10.0000	-10.0000	+INF	EPS
ABC	-10.0000	1.110223E-16	+INF	.
BCD	-10.0000	-10.0000	+INF	.
CDE	-10.0000	.	+INF	.
AB	-10.0000	1.110223E-16	+INF	.
BC	-10.0000	1.110223E-16	+INF	.
CD	-10.0000	-10.0000	+INF	.
DE	-10.0000	-10.0000	+INF	21.9397

---- EQU eq7a

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-INF	10.0000	10.0000	.
ABCD	-INF	10.0000	10.0000	EPS
BCDE	-INF	10.0000	10.0000	.
ABC	-INF	.	10.0000	.
BCD	-INF	10.0000	10.0000	.
CDE	-INF	-4.44089E-16	10.0000	.
AB	-INF	1.361427E-20	10.0000	.
BC	-INF	.	10.0000	.
CD	-INF	10.0000	10.0000	.
DE	-INF	10.0000	10.0000	.

---- EQU eq7b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-10.0000	-10.0000	+INF	.
ABCD	-10.0000	-10.0000	+INF	.
BCDE	-10.0000	-10.0000	+INF	.
ABC	-10.0000	-6.61418E-21	+INF	.
BCD	-10.0000	-10.0000	+INF	21.9397
CDE	-10.0000	-4.44089E-16	+INF	.
AB	-10.0000	-1.36143E-20	+INF	.
BC	-10.0000	.	+INF	.
CD	-10.0000	-10.0000	+INF	.
DE	-10.0000	-10.0000	+INF	EPS

---- EQU eq8

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.A	.	.	.	EPS
ABCD.B	.	.	.	5.5823
ABCD.C	.	.	.	52.1671
ABCD.D	.	.	.	-14.5520
ABCD.E	.	.	.	-17.2131
BCDE.A	.	.	.	-7.8879
BCDE.B	.	.	.	106.2748
BCDE.C	.	.	.	246.5329
BCDE.D	.	.	.	433.5499
BCDE.E	.	.	.	370.2771
ABC .A	.	.	.	EPS
ABC .B	.	.	.	EPS
ABC .C	.	.	.	EPS
ABC .D	.	.	.	-14.5520
ABC .E	.	.	.	-17.2131
BCD .A	.	.	.	EPS
BCD .B	.	.	.	5.5823

BCD .C	.	.	.	52.1671
BCD .D	.	.	.	-14.5520
BCD .E	.	.	.	-17.2131
CDE .A	.	.	.	EPS
CDE .B	.	.	.	EPS
CDE .C	.	.	.	EPS
CDE .D	.	.	.	EPS
CDE .E	.	.	.	EPS
AB .A	.	.	.	EPS
AB .B	.	.	.	EPS
AB .C	.	.	.	EPS
AB .D	.	.	.	EPS
AB .E	.	.	.	EPS
BC .A	.	.	.	EPS
BC .B	.	.	.	EPS
BC .C	.	.	.	EPS
BC .D	.	.	.	EPS
BC .E	.	.	.	EPS
CD .A	.	.	.	34.8789
CD .B	.	.	.	61.0728
CD .C	.	.	.	62.1122
CD .D	.	.	.	0.7064
CD .E	.	.	.	0.3798
DE .A	.	.	.	EPS
DE .B	.	.	.	90.3242
DE .C	.	.	.	EPS
DE .D	.	.	.	476.6873
DE .E	.	.	.	296.2589

---- EQU eq10

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	.	.	.
BCDE	-INF	.	.	-52.5892
ABC	-INF	.	.	.
BCD	-INF	.	.	.
CDE	-INF	.	.	-46.0758
AB	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	.	.	-20.9717
DE	-INF	.	.	-46.0758

---- EQU eq11

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	.	+INF	8.5689
BCDE	.	.	+INF	.
ABC	.	.	+INF	0.9354
BCD	.	.	+INF	8.5689
CDE	.	.	+INF	.
AB	.	.	+INF	0.9354
BC	.	.	+INF	0.9354
CD	.	.	+INF	.
DE	.	.	+INF	.

---- EQU eq12

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	.	.	EPS
BCDE	-INF	.	.	EPS

ABC	-INF	.	.	EPS
BCD	-INF	.	.	EPS
CDE	-INF	.	.	.
AB	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	.	.	.
DE	-INF	.	.	.

---- EQU eq13

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	.	+INF	.
BCDE	.	.	+INF	.
ABC	.	.	+INF	.
BCD	.	.	+INF	.
CDE	.	.	+INF	EPS
AB	.	.	+INF	EPS
BC	.	.	+INF	EPS
CD	.	.	+INF	21.9397
DE	.	.	+INF	EPS

---- EQU eq14

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-INF	.	10.0000	.
ABCD	-INF	-1.1611	10.0000	.
BCDE	-INF	1.1611	10.0000	.
ABC	-INF	-1.6257	10.0000	.
BCD	-INF	-1.6076	10.0000	.
CDE	-INF	3.2333	10.0000	.
AB	-INF	-1.6257	10.0000	.
BC	-INF	-2.0594	10.0000	.
CD	-INF	0.4518	10.0000	.
DE	-INF	3.2333	10.0000	.

---- EQU eq15

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-10.0000	.	+INF	.
ABCD	-10.0000	-1.1611	+INF	.
BCDE	-10.0000	1.1611	+INF	.
ABC	-10.0000	-1.6257	+INF	.
BCD	-10.0000	-1.6076	+INF	.
CDE	-10.0000	3.2333	+INF	.
AB	-10.0000	-1.6257	+INF	.
BC	-10.0000	-2.0594	+INF	.
CD	-10.0000	0.4518	+INF	.
DE	-10.0000	3.2333	+INF	.

---- EQU eq16

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	-9.5354	.	.
ABC	-INF	.	.	EPS
BCD	-INF	-10.0128	.	.
AB	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	-8.6563	.	.

---- EQU eq17

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	10.4646	+INF	.
ABC	.	.	+INF	.
BCD	.	9.9872	+INF	.
AB	.	.	+INF	.
BC	.	.	+INF	0.0736
CD	.	11.3437	+INF	.

---- EQU eq18

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	-9.3783	.	.
ABC	-INF	.	.	.
BCD	-INF	-9.8149	.	.
AB	-INF	.	.	EPS
BC	-INF	.	.	.
CD	-INF	-8.8563	.	.

---- EQU eq19

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	10.6217	+INF	.
ABC	.	.	+INF	.
BCD	.	10.1851	+INF	.
AB	.	.	+INF	EPS
BC	.	.	+INF	.
CD	.	11.1437	+INF	.

---- EQU eq20

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	-INF	-8.5257	.	.
BCD	-INF	-9.8149	.	.
CDE	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	-8.8563	.	.
DE	-INF	-8.4495	.	.

---- EQU eq21

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	.	11.4743	+INF	.
BCD	.	10.1851	+INF	.
CDE	.	.	+INF	.
BC	.	.	+INF	.
CD	.	11.1437	+INF	.
DE	.	11.5505	+INF	.

---- EQU eq22

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	-INF	-7.9278	.	.
BCD	-INF	-10.0128	.	.
CDE	-INF	.	.	.
BC	-INF	.	.	.

CD	-INF	-8.6563	.	.
DE	-INF	-8.2045	.	.

---- EQU eq23

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	.	12.0722	+INF	.
BCD	.	9.9872	+INF	.
CDE	.	.	+INF	.
BC	.	.	+INF	.
CD	.	11.3437	+INF	.
DE	.	11.7955	+INF	.

---- EQU eq24

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.A	-INF	-2.0000	.	.
ABCD.B	-INF	-2.1280	.	.
ABCD.C	-INF	-2.0160	.	.
ABCD.D	-INF	-2.0131	.	.
ABCD.E	-INF	-2.0000	.	.
ABC .A	-INF	.	.	.
ABC .B	-INF	.	.	.
ABC .C	-INF	.	.	.
ABC .D	-INF	.	.	.
ABC .E	-INF	.	.	.
BCD .A	-INF	-2.0000	.	.
BCD .B	-INF	-1.8720	.	.
BCD .C	-INF	-2.1840	.	.
BCD .D	-INF	-2.1419	.	.
BCD .E	-INF	-2.0000	.	.
AB .A	-INF	.	.	.
AB .B	-INF	.	.	.
AB .C	-INF	.	.	.
AB .D	-INF	.	.	.
AB .E	-INF	.	.	.
BC .A	-INF	.	.	-0.3788
BC .B	-INF	.	.	.
BC .C	-INF	.	.	.
BC .D	-INF	.	.	.
BC .E	-INF	.	.	.
CD .A	-INF	-2.0000	.	.
CD .B	-INF	-2.0000	.	.
CD .C	-INF	-1.8000	.	.
CD .D	-INF	-2.0000	.	.
CD .E	-INF	-2.0000	.	.

---- EQU eq25

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.A	.	2.0000	+INF	.
ABCD.B	.	1.8720	+INF	.
ABCD.C	.	1.9840	+INF	.
ABCD.D	.	1.9869	+INF	.
ABCD.E	.	2.0000	+INF	.
ABC .A	.	.	+INF	.
ABC .B	.	.	+INF	.
ABC .C	.	.	+INF	.
ABC .D	.	.	+INF	.
ABC .E	.	.	+INF	.

BCD .A	.	2.0000	+INF	.
BCD .B	.	2.1280	+INF	.
BCD .C	.	1.8160	+INF	.
BCD .D	.	1.8581	+INF	.
BCD .E	.	2.0000	+INF	.
AB .A	.	.	+INF	.
AB .B	.	.	+INF	EPS
AB .C	.	.	+INF	EPS
AB .D	.	.	+INF	EPS
AB .E	.	.	+INF	EPS
BC .A	.	.	+INF	.
BC .B	.	.	+INF	EPS
BC .C	.	.	+INF	.
BC .D	.	.	+INF	.
BC .E	.	.	+INF	.
CD .A	.	2.0000	+INF	.
CD .B	.	2.0000	+INF	.
CD .C	.	2.2000	+INF	.
CD .D	.	2.0000	+INF	.
CD .E	.	2.0000	+INF	.

---- EQU eq26

	LOWER	LEVEL	UPPER	MARGINAL
BCDE.A	-INF	-2.0000	.	.
BCDE.B	-INF	-2.2720	.	.
BCDE.C	-INF	-2.1840	.	.
BCDE.D	-INF	-2.1419	.	.
BCDE.E	-INF	-2.0000	.	.
BCD .A	-INF	-2.0000	.	.
BCD .B	-INF	-2.1280	.	.
BCD .C	-INF	-1.8160	.	.
BCD .D	-INF	-1.8581	.	.
BCD .E	-INF	-2.0000	.	.
CDE .A	-INF	.	.	.
CDE .B	-INF	.	.	.
CDE .C	-INF	.	.	.
CDE .D	-INF	.	.	.
CDE .E	-INF	.	.	.
BC .A	-INF	.	.	.
BC .B	-INF	.	.	.
BC .C	-INF	.	.	.
BC .D	-INF	.	.	.
BC .E	-INF	.	.	.
CD .A	-INF	-2.0000	.	.
CD .B	-INF	-2.0000	.	.
CD .C	-INF	-2.2000	.	.
CD .D	-INF	-2.0000	.	.
CD .E	-INF	-2.0000	.	.
DE .A	-INF	-2.0000	.	.
DE .B	-INF	-2.0000	.	.
DE .C	-INF	-2.0000	.	.
DE .D	-INF	-2.2451	.	.
DE .E	-INF	-2.0000	.	.

---- EQU eq27

	LOWER	LEVEL	UPPER	MARGINAL
BCDE.A	.	2.0000	+INF	.
BCDE.B	.	1.7280	+INF	.
BCDE.C	.	1.8160	+INF	.

BCDE.D	.	1.8581	+INF	.
BCDE.E	.	2.0000	+INF	.
BCD .A	.	2.0000	+INF	.
BCD .B	.	1.8720	+INF	.
BCD .C	.	2.1840	+INF	.
BCD .D	.	2.1419	+INF	.
BCD .E	.	2.0000	+INF	.
CDE .A	.	.	+INF	.
CDE .B	.	.	+INF	.
CDE .C	.	.	+INF	.
CDE .D	.	.	+INF	476.6873
CDE .E	.	.	+INF	296.2589
BC .A	.	.	+INF	.
BC .B	.	.	+INF	.
BC .C	.	.	+INF	.
BC .D	.	.	+INF	.
BC .E	.	.	+INF	EPS
CD .A	.	2.0000	+INF	.
CD .B	.	2.0000	+INF	.
CD .C	.	1.8000	+INF	.
CD .D	.	2.0000	+INF	.
CD .E	.	2.0000	+INF	.
DE .A	.	2.0000	+INF	.
DE .B	.	2.0000	+INF	.
DE .C	.	2.0000	+INF	.
DE .D	.	1.7549	+INF	.
DE .E	.	2.0000	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU eq28	0.6000	0.6000	0.6000	0.1993
---- EQU eq29	0.4000	0.4000	0.4000	EPS
---- EQU eq30	0.2000	0.2000	0.2000	-39.4088
---- EQU eq31	0.4000	0.4000	0.4000	-0.2810
---- EQU eq32	0.4000	0.4000	0.4000	-160.4318
---- EQU eq33	-INF	-11.6594	0.4000	.
---- EQU eq34	0.4000	8.3406	+INF	.
---- EQU eq35	-INF	-11.1437	0.2000	.
---- EQU eq36	0.2000	8.8563	+INF	.
---- EQU eq37	-INF	0.4000	0.4000	.
---- EQU eq38	0.4000	0.4000	+INF	21.9397

---- EQU eq39

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	-9.5354	.	.
ABC	-INF	.	.	.
AB	-INF	.	.	.

---- EQU eq40

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	-9.3783	.	.
ABC	-INF	.	.	EPS
AB	-INF	.	.	.

---- EQU eq41

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	-INF	-7.9278	.	.

CDE	-INF	.	.	.
DE	-INF	-8.2045	.	.

---- EQU eq42

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	-INF	-8.5257	.	.
CDE	-INF	.	.	.
DE	-INF	-8.4495	.	.

---- EQU eq43

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1 .A	-INF	.	2.0000	.
ABCDE.t2 .A	-INF	.	2.0000	.
ABCDE.t3 .A	-INF	.	2.0000	.
ABCDE.t3 .B	-INF	0.2720	2.0000	.
ABCDE.t4 .A	-INF	.	2.0000	.
ABCDE.t5 .A	-INF	.	2.0000	.
ABCDE.t5 .B	-INF	0.2720	2.0000	.
ABCDE.t6 .A	-INF	.	2.0000	.
ABCDE.t6 .B	-INF	0.2720	2.0000	.
ABCDE.t6 .C	-INF	0.1840	2.0000	.
ABCDE.t7 .A	-INF	2.0000	2.0000	-97.6995
ABCDE.t8 .A	-INF	.	2.0000	.
ABCDE.t8 .B	-INF	0.2720	2.0000	.
ABCDE.t9 .A	-INF	.	2.0000	.
ABCDE.t9 .B	-INF	0.2720	2.0000	.
ABCDE.t9 .C	-INF	0.1840	2.0000	.
ABCDE.t10.A	-INF	.	2.0000	.
ABCDE.t10.B	-INF	0.2720	2.0000	.
ABCDE.t10.C	-INF	0.1840	2.0000	.
ABCDE.t10.D	-INF	0.3869	2.0000	.
ABCD .t11.A	-INF	2.0000	2.0000	EPS
ABCD .t12.A	-INF	.	2.0000	.
ABCD .t13.A	-INF	.	2.0000	.
ABCD .t13.B	-INF	0.1280	2.0000	.
ABCD .t14.A	-INF	.	2.0000	.
ABCD .t15.A	-INF	.	2.0000	.
ABCD .t15.B	-INF	0.1280	2.0000	.
ABCD .t16.A	-INF	.	2.0000	.
ABCD .t16.B	-INF	0.1280	2.0000	.
ABCD .t16.C	-INF	0.0160	2.0000	.
BCDE .t17.A	-INF	.	2.0000	.
BCDE .t17.B	-INF	.	2.0000	.
BCDE .t18.A	-INF	.	2.0000	.
BCDE .t18.B	-INF	.	2.0000	.
BCDE .t19.A	-INF	.	2.0000	.
BCDE .t19.B	-INF	.	2.0000	.
BCDE .t19.C	-INF	.	2.0000	.
BCDE .t20.A	-INF	.	2.0000	.
BCDE .t20.B	-INF	.	2.0000	.
BCDE .t21.A	-INF	2.0000	2.0000	.
BCDE .t21.B	-INF	2.0000	2.0000	-115.9682
BCDE .t21.C	-INF	2.0000	2.0000	-265.2438
BCDE .t22.A	-INF	.	2.0000	.
BCDE .t22.B	-INF	.	2.0000	.
BCDE .t22.C	-INF	.	2.0000	.
BCDE .t22.D	-INF	0.2451	2.0000	.
ABC .t23.A	-INF	.	2.0000	.
ABC .t24.A	-INF	.	2.0000	.

ABC	.t25.A	-INF	.	2.0000	.
ABC	.t25.B	-INF	-2.72285E-21	2.0000	.
BCD	.t26.A	-INF	2.0000	2.0000	.
BCD	.t26.B	-INF	2.0000	2.0000	-5.5823
BCD	.t27.A	-INF	.	2.0000	.
BCD	.t27.B	-INF	.	2.0000	.
BCD	.t28.A	-INF	.	2.0000	.
BCD	.t28.B	-INF	.	2.0000	.
BCD	.t28.C	-INF	0.2000	2.0000	.
CDE	.t29.A	-INF	.	2.0000	.
CDE	.t29.B	-INF	.	2.0000	.
CDE	.t29.C	-INF	.	2.0000	.
CDE	.t30.A	-INF	.	2.0000	.
CDE	.t30.B	-INF	.	2.0000	.
CDE	.t30.C	-INF	.	2.0000	.
CDE	.t31.A	-INF	.	2.0000	.
CDE	.t31.B	-INF	.	2.0000	.
CDE	.t31.C	-INF	.	2.0000	.
CDE	.t31.D	-INF	0.2451	2.0000	.
AB	.t32.A	-INF	.	2.0000	.
BC	.t33.A	-INF	.	2.0000	.
BC	.t33.B	-INF	.	2.0000	.
CD	.t34.A	-INF	2.0000	2.0000	-34.7208
CD	.t34.B	-INF	2.0000	2.0000	-60.8604
CD	.t34.C	-INF	2.0000	2.0000	-62.0778
DE	.t35.A	-INF	2.0000	2.0000	.
DE	.t35.B	-INF	2.0000	2.0000	.
DE	.t35.C	-INF	2.0000	2.0000	.
DE	.t35.D	-INF	2.0000	2.0000	-410.4658

---- EQU eq44

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1 .A	-2.0000	.	+INF	.
ABCDE.t2 .A	-2.0000	.	+INF	.
ABCDE.t3 .A	-2.0000	.	+INF	.
ABCDE.t3 .B	-2.0000	0.2720	+INF	.
ABCDE.t4 .A	-2.0000	.	+INF	.
ABCDE.t5 .A	-2.0000	.	+INF	.
ABCDE.t5 .B	-2.0000	0.2720	+INF	.
ABCDE.t6 .A	-2.0000	.	+INF	.
ABCDE.t6 .B	-2.0000	0.2720	+INF	.
ABCDE.t6 .C	-2.0000	0.1840	+INF	.
ABCDE.t7 .A	-2.0000	-2.0000	+INF	.
ABCDE.t8 .A	-2.0000	.	+INF	.
ABCDE.t8 .B	-2.0000	0.2720	+INF	.
ABCDE.t9 .A	-2.0000	.	+INF	.
ABCDE.t9 .B	-2.0000	0.2720	+INF	.
ABCDE.t9 .C	-2.0000	0.1840	+INF	.
ABCDE.t10.A	-2.0000	.	+INF	.
ABCDE.t10.B	-2.0000	0.2720	+INF	.
ABCDE.t10.C	-2.0000	0.1840	+INF	.
ABCDE.t10.D	-2.0000	0.3869	+INF	.
ABCD .t11.A	-2.0000	-2.0000	+INF	.
ABCD .t12.A	-2.0000	.	+INF	.
ABCD .t13.A	-2.0000	.	+INF	.
ABCD .t13.B	-2.0000	0.1280	+INF	.
ABCD .t14.A	-2.0000	.	+INF	.
ABCD .t15.A	-2.0000	.	+INF	.
ABCD .t15.B	-2.0000	0.1280	+INF	.
ABCD .t16.A	-2.0000	.	+INF	.
ABCD .t16.B	-2.0000	0.1280	+INF	.

ABCD .t16.C	-2.0000	0.0160	+INF	.
BCDE .t17.A	-2.0000	.	+INF	.
BCDE .t17.B	-2.0000	.	+INF	.
BCDE .t18.A	-2.0000	.	+INF	.
BCDE .t18.B	-2.0000	.	+INF	.
BCDE .t19.A	-2.0000	.	+INF	.
BCDE .t19.B	-2.0000	.	+INF	.
BCDE .t19.C	-2.0000	.	+INF	.
BCDE .t20.A	-2.0000	.	+INF	.
BCDE .t20.B	-2.0000	.	+INF	.
BCDE .t21.A	-2.0000	-2.0000	+INF	.
BCDE .t21.B	-2.0000	-2.0000	+INF	.
BCDE .t21.C	-2.0000	-2.0000	+INF	.
BCDE .t22.A	-2.0000	.	+INF	.
BCDE .t22.B	-2.0000	.	+INF	.
BCDE .t22.C	-2.0000	.	+INF	.
BCDE .t22.D	-2.0000	0.2451	+INF	.
ABC .t23.A	-2.0000	.	+INF	.
ABC .t24.A	-2.0000	.	+INF	.
ABC .t25.A	-2.0000	.	+INF	.
ABC .t25.B	-2.0000	-2.72285E-21	+INF	.
BCD .t26.A	-2.0000	-2.0000	+INF	.
BCD .t26.B	-2.0000	-2.0000	+INF	.
BCD .t27.A	-2.0000	.	+INF	.
BCD .t27.B	-2.0000	.	+INF	.
BCD .t28.A	-2.0000	.	+INF	.
BCD .t28.B	-2.0000	.	+INF	.
BCD .t28.C	-2.0000	0.2000	+INF	.
CDE .t29.A	-2.0000	.	+INF	.
CDE .t29.B	-2.0000	.	+INF	.
CDE .t29.C	-2.0000	.	+INF	.
CDE .t30.A	-2.0000	.	+INF	.
CDE .t30.B	-2.0000	.	+INF	.
CDE .t30.C	-2.0000	.	+INF	.
CDE .t31.A	-2.0000	.	+INF	.
CDE .t31.B	-2.0000	.	+INF	.
CDE .t31.C	-2.0000	.	+INF	.
CDE .t31.D	-2.0000	0.2451	+INF	.
AB .t32.A	-2.0000	.	+INF	.
BC .t33.A	-2.0000	.	+INF	.
BC .t33.B	-2.0000	.	+INF	.
CD .t34.A	-2.0000	-2.0000	+INF	.
CD .t34.B	-2.0000	-2.0000	+INF	.
CD .t34.C	-2.0000	-2.0000	+INF	.
DE .t35.A	-2.0000	-2.0000	+INF	.
DE .t35.B	-2.0000	-2.0000	+INF	.
DE .t35.C	-2.0000	-2.0000	+INF	.
DE .t35.D	-2.0000	-2.0000	+INF	.

---- EQU eq45

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1 .B	-INF	0.1280	2.0000	.
ABCDE.t1 .C	-INF	0.0160	2.0000	.
ABCDE.t1 .D	-INF	0.0131	2.0000	.
ABCDE.t1 .E	-INF	.	2.0000	.
ABCDE.t2 .C	-INF	0.0160	2.0000	.
ABCDE.t2 .D	-INF	0.0131	2.0000	.
ABCDE.t2 .E	-INF	.	2.0000	.
ABCDE.t3 .C	-INF	0.0160	2.0000	.
ABCDE.t3 .D	-INF	0.0131	2.0000	.
ABCDE.t3 .E	-INF	.	2.0000	.

ABCDE.t4 .D	-INF	0.0131	2.0000	.
ABCDE.t4 .E	-INF	.	2.0000	.
ABCDE.t5 .D	-INF	0.0131	2.0000	.
ABCDE.t5 .E	-INF	.	2.0000	.
ABCDE.t6 .D	-INF	0.0131	2.0000	.
ABCDE.t6 .E	-INF	.	2.0000	.
ABCDE.t7 .E	-INF	2.0000	2.0000	-1168.1848
ABCDE.t8 .E	-INF	6.614185E-22	2.0000	.
ABCDE.t9 .E	-INF	.	2.0000	.
ABCDE.t10.E	-INF	.	2.0000	.
ABCD .t11.B	-INF	2.0000	2.0000	-5.5823
ABCD .t11.C	-INF	2.0000	2.0000	-52.1671
ABCD .t11.D	-INF	2.0000	2.0000	.
ABCD .t11.E	-INF	2.0000	2.0000	.
ABCD .t12.C	-INF	.	2.0000	.
ABCD .t12.D	-INF	.	2.0000	.
ABCD .t12.E	-INF	.	2.0000	.
ABCD .t13.C	-INF	.	2.0000	.
ABCD .t13.D	-INF	.	2.0000	.
ABCD .t13.E	-INF	.	2.0000	.
ABCD .t14.D	-INF	.	2.0000	.
ABCD .t14.E	-INF	.	2.0000	.
ABCD .t15.D	-INF	.	2.0000	.
ABCD .t15.E	-INF	.	2.0000	.
ABCD .t16.D	-INF	6.614185E-22	2.0000	.
ABCD .t16.E	-INF	6.614185E-22	2.0000	.
BCDE .t17.C	-INF	0.1840	2.0000	.
BCDE .t17.D	-INF	0.1419	2.0000	.
BCDE .t17.E	-INF	.	2.0000	.
BCDE .t18.D	-INF	0.1419	2.0000	.
BCDE .t18.E	-INF	.	2.0000	.
BCDE .t19.D	-INF	0.1419	2.0000	.
BCDE .t19.E	-INF	.	2.0000	.
BCDE .t20.E	-INF	.	2.0000	.
BCDE .t21.E	-INF	2.0000	2.0000	-1156.3747
BCDE .t22.E	-INF	.	2.0000	.
ABC .t23.B	-INF	2.722855E-21	2.0000	.
ABC .t23.C	-INF	2.722855E-21	2.0000	.
ABC .t23.D	-INF	2.722855E-21	2.0000	.
ABC .t23.E	-INF	2.722855E-21	2.0000	.
ABC .t24.C	-INF	3.384273E-21	2.0000	.
ABC .t24.D	-INF	3.384273E-21	2.0000	.
ABC .t24.E	-INF	3.384273E-21	2.0000	.
ABC .t25.C	-INF	2.722855E-21	2.0000	.
ABC .t25.D	-INF	2.722855E-21	2.0000	.
ABC .t25.E	-INF	2.722855E-21	2.0000	.
BCD .t26.C	-INF	2.0000	2.0000	-53.8782
BCD .t26.D	-INF	2.0000	2.0000	.
BCD .t26.E	-INF	2.0000	2.0000	.
BCD .t27.D	-INF	.	2.0000	.
BCD .t27.E	-INF	.	2.0000	.
BCD .t28.D	-INF	.	2.0000	.
BCD .t28.E	-INF	.	2.0000	.
CDE .t29.D	-INF	.	2.0000	.
CDE .t29.E	-INF	.	2.0000	.
CDE .t30.E	-INF	.	2.0000	.
CDE .t31.E	-INF	.	2.0000	.
AB .t32.B	-INF	.	2.0000	.
AB .t32.C	-INF	.	2.0000	.
AB .t32.D	-INF	.	2.0000	.
AB .t32.E	-INF	.	2.0000	.
BC .t33.C	-INF	.	2.0000	.
BC .t33.D	-INF	.	2.0000	.

BC	.t33.E	-INF	.	2.0000	.
CD	.t34.D	-INF	2.0000	2.0000	.
CD	.t34.E	-INF	2.0000	2.0000	.
DE	.t35.E	-INF	2.0000	2.0000	-1173.0145

---- EQU uw1a

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	-INF	200.0000	200.0000	.
ABCDE.r2	-INF	200.0000	200.0000	.
ABCDE.r3	-INF	200.0000	200.0000	.
ABCDE.r4	-INF	200.0000	200.0000	.
ABCD .r1	-INF	200.0000	200.0000	EPS
ABCD .r2	-INF	200.0000	200.0000	EPS
ABCD .r3	-INF	200.0000	200.0000	EPS
BCDE .r2	-INF	200.0000	200.0000	.
BCDE .r3	-INF	200.0000	200.0000	.
BCDE .r4	-INF	200.0000	200.0000	.
ABC .r1	-INF	0.7148	200.0000	.
ABC .r2	-INF	-0.6310	200.0000	.
BCD .r2	-INF	200.0000	200.0000	.
BCD .r3	-INF	200.0000	200.0000	EPS
CDE .r3	-INF	-36.7900	200.0000	.
CDE .r4	-INF	-43.4826	200.0000	.
AB .r1	-INF	0.7148	200.0000	.
BC .r2	-INF	-0.3583	200.0000	.
CD .r3	-INF	200.0000	200.0000	-0.1137
DE .r4	-INF	200.0000	200.0000	-68.0155

---- EQU uw1b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	-200.0000	-200.0000	+INF	0.8464
ABCDE.r2	-200.0000	-200.0000	+INF	0.1539
ABCDE.r3	-200.0000	-200.0000	+INF	0.0234
ABCDE.r4	-200.0000	-200.0000	+INF	.
ABCD .r1	-200.0000	-200.0000	+INF	.
ABCD .r2	-200.0000	-200.0000	+INF	.
ABCD .r3	-200.0000	-200.0000	+INF	.
BCDE .r2	-200.0000	-200.0000	+INF	EPS
BCDE .r3	-200.0000	-200.0000	+INF	EPS
BCDE .r4	-200.0000	-200.0000	+INF	.
ABC .r1	-200.0000	0.7148	+INF	.
ABC .r2	-200.0000	-0.6310	+INF	.
BCD .r2	-200.0000	-200.0000	+INF	.
BCD .r3	-200.0000	-200.0000	+INF	.
CDE .r3	-200.0000	-36.7900	+INF	.
CDE .r4	-200.0000	-43.4826	+INF	.
AB .r1	-200.0000	0.7148	+INF	.
BC .r2	-200.0000	-0.3583	+INF	.
CD .r3	-200.0000	-200.0000	+INF	.
DE .r4	-200.0000	-200.0000	+INF	.

---- EQU uw2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	-INF	200.0000	200.0000	-1.7285
ABCDE.r2	-INF	200.0000	200.0000	-1.1924
ABCDE.r3	-INF	200.0000	200.0000	-0.4083
ABCDE.r4	-INF	200.0000	200.0000	-61.2756

ABCD .r1	-INF	199.9337	200.0000	EPS
ABCD .r2	-INF	199.2880	200.0000	.
ABCD .r3	-INF	199.2184	200.0000	.
BCDE .r2	-INF	197.5784	200.0000	.
BCDE .r3	-INF	199.2981	200.0000	.
BCDE .r4	-INF	200.0000	200.0000	-61.1581
ABC .r1	-INF	0.7148	200.0000	.
ABC .r2	-INF	-0.6310	200.0000	.
BCD .r2	-INF	200.0000	200.0000	-1.0843
BCD .r3	-INF	198.7156	200.0000	.
CDE .r3	-INF	.	200.0000	.
CDE .r4	-INF	.	200.0000	.
AB .r1	-INF	0.7148	200.0000	.
BC .r2	-INF	-0.3583	200.0000	.
CD .r3	-INF	200.0000	200.0000	.
DE .r4	-INF	200.0000	200.0000	.

---- EQU uw3

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	-INF	200.0000	200.0000	.
ABCDE.r2	-INF	200.0000	200.0000	.
ABCDE.r3	-INF	200.0000	200.0000	.
ABCDE.r4	-INF	200.0000	200.0000	-0.6219
ABCD .r1	-INF	199.9337	200.0000	.
ABCD .r2	-INF	199.2880	200.0000	.
ABCD .r3	-INF	199.2184	200.0000	.
BCDE .r2	-INF	197.5784	200.0000	.
BCDE .r3	-INF	199.2981	200.0000	.
BCDE .r4	-INF	200.0000	200.0000	-5.8875
ABC .r1	-INF	6.614185E-20	200.0000	.
ABC .r2	-INF	6.614185E-20	200.0000	.
BCD .r2	-INF	200.0000	200.0000	-7.6009
BCD .r3	-INF	198.7156	200.0000	.
CDE .r3	-INF	36.7900	200.0000	.
CDE .r4	-INF	43.4826	200.0000	.
AB .r1	-INF	2.722855E-19	200.0000	.
BC .r2	-INF	.	200.0000	.
CD .r3	-INF	200.0000	200.0000	-0.1504
DE .r4	-INF	200.0000	200.0000	-78.8194

---- EQU heat5

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-INF	.	1.0000	.
ABCD	-INF	.	1.0000	.
BCDE	-INF	.	1.0000	.
ABC	-INF	.	1.0000	.
BCD	-INF	.	1.0000	.
CDE	-INF	.	1.0000	.
AB	-INF	.	1.0000	.
BC	-INF	.	1.0000	.
CD	-INF	.	1.0000	.
DE	-INF	.	1.0000	.
A	-INF	1.0000	1.0000	EPS
B	-INF	1.0000	1.0000	.
C	-INF	1.0000	1.0000	.
D	-INF	.	1.0000	.
E	-INF	1.0000	1.0000	EPS

---- EQU heat6

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	EPS
ABCD	.	.	.	EPS
BCDE	.	.	.	EPS
ABC	.	.	.	EPS
BCD	.	.	.	EPS
CDE	.	.	.	EPS
AB	.	.	.	EPS
BC	.	.	.	EPS
CD	.	.	.	EPS
DE	.	.	.	EPS
A	.	.	.	.
B	.	.	.	EPS
C	.	.	.	EPS
D	.	.	.	EPS
E	.	.	.	.

---- EQU heat7

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.t7	-1.0000	-1.0000	+INF	.
ABCD.t8	-1.0000	-3.30709E-22	+INF	.
ABCD.t9	-1.0000	.	+INF	.
ABCD.t10	-1.0000	.	+INF	.
ABC .t4	-1.0000	.	+INF	.
ABC .t5	-1.0000	.	+INF	.
ABC .t6	-1.0000	.	+INF	.
ABC .t14	-1.0000	.	+INF	.
ABC .t15	-1.0000	.	+INF	.
ABC .t16	-1.0000	-3.30709E-22	+INF	.
BCD .t20	-1.0000	.	+INF	.
BCD .t21	-1.0000	-1.0000	+INF	.
BCD .t22	-1.0000	.	+INF	.
AB .t2	-1.0000	.	+INF	.
AB .t3	-1.0000	.	+INF	.
AB .t12	-1.0000	.	+INF	.
AB .t13	-1.0000	.	+INF	.
AB .t24	-1.0000	-3.30709E-22	+INF	.
AB .t25	-1.0000	.	+INF	.
BC .t18	-1.0000	.	+INF	.
BC .t19	-1.0000	.	+INF	.
BC .t27	-1.0000	.	+INF	.
BC .t28	-1.0000	.	+INF	.
CD .t30	-1.0000	.	+INF	.
CD .t31	-1.0000	.	+INF	.

---- EQU heat8

	LOWER	LEVEL	UPPER	MARGINAL
A.t1	-1.0000	.	+INF	.
A.t11	-1.0000	-1.0000	+INF	50.6667
A.t23	-1.0000	.	+INF	.
A.t32	-1.0000	.	+INF	.
B.t17	-1.0000	.	+INF	.
B.t26	-1.0000	-1.0000	+INF	76.0000
B.t33	-1.0000	.	+INF	.
C.t29	-1.0000	.	+INF	.
C.t34	-1.0000	-1.0000	+INF	152.0000
D.t35	-1.0000	-1.0000	+INF	.

---- EQU heat9

	LOWER	LEVEL	UPPER	MARGINAL
BCDE.t1	-1.0000	.	+INF	.
BCDE.t2	-1.0000	.	+INF	.
BCDE.t4	-1.0000	.	+INF	.
BCDE.t7	-1.0000	-1.0000	+INF	.
BCD .t11	-1.0000	-1.0000	+INF	.
BCD .t12	-1.0000	.	+INF	.
BCD .t14	-1.0000	.	+INF	.
CDE .t3	-1.0000	.	+INF	.
CDE .t5	-1.0000	.	+INF	.
CDE .t8	-1.0000	-3.30709E-22	+INF	.
CDE .t17	-1.0000	.	+INF	.
CDE .t18	-1.0000	.	+INF	.
CDE .t20	-1.0000	.	+INF	.
BC .t23	-1.0000	.	+INF	.
BC .t24	-1.0000	-3.30709E-22	+INF	.
CD .t13	-1.0000	.	+INF	.
CD .t15	-1.0000	.	+INF	.
CD .t26	-1.0000	-1.0000	+INF	.
CD .t27	-1.0000	.	+INF	.
DE .t6	-1.0000	.	+INF	.
DE .t9	-1.0000	.	+INF	.
DE .t19	-1.0000	.	+INF	.
DE .t21	-1.0000	-1.0000	+INF	.
DE .t29	-1.0000	.	+INF	.
DE .t30	-1.0000	.	+INF	.

---- EQU heat10

	LOWER	LEVEL	UPPER	MARGINAL
B.t32	-1.0000	-1.0000	+INF	.
C.t25	-1.0000	-1.0000	+INF	.
C.t33	-1.0000	-1.0000	+INF	.
D.t16	-1.0000	-3.30709E-22	+INF	.
D.t28	-1.0000	.	+INF	.
D.t34	-1.0000	-1.0000	+INF	EPS
E.t10	-1.0000	.	+INF	.
E.t22	-1.0000	.	+INF	.
E.t31	-1.0000	.	+INF	.
E.t35	-1.0000	-1.0000	+INF	2036.0000

---- EQU heat11

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.ABCD	-1000.0000	-27.5880	+INF	.
ABCD .ABC	-1000.0000	-30.0141	+INF	.
BCDE .BCD	-1000.0000	-43.1021	+INF	.
ABC .AB	-1000.0000	-30.0141	+INF	.
BCD .BC	-1000.0000	-27.3404	+INF	.
CDE .CD	-1000.0000	.	+INF	.
AB .A	-1000.0000	-1000.0000	+INF	0.0507
BC .B	-1000.0000	-1000.0000	+INF	0.0760
CD .C	-1000.0000	-1000.0000	+INF	0.1520
DE .D	-1000.0000	-16.2057	+INF	.

---- EQU heat12

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.ABCD	-INF	-27.5880	1000.0000	.
ABCD .ABC	-INF	-30.0141	1000.0000	.
BCDE .BCD	-INF	-43.1021	1000.0000	.
ABC .AB	-INF	-30.0141	1000.0000	.
BCD .BC	-INF	-27.3404	1000.0000	.
CDE .CD	-INF	.	1000.0000	.
AB .A	-INF	1000.0000	1000.0000	.
BC .B	-INF	1000.0000	1000.0000	.
CD .C	-INF	1000.0000	1000.0000	.
DE .D	-INF	-16.2057	1000.0000	.

---- EQU heat13

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.BCDE	-1000.0000	-52.4184	+INF	.
ABCD .BCD	-1000.0000	-2.4617	+INF	.
BCDE .CDE	-1000.0000	-78.7164	+INF	.
ABC .BC	-1000.0000	.	+INF	.
BCD .CD	-1000.0000	-5.7933	+INF	.
CDE .DE	-1000.0000	-78.7164	+INF	.
AB .B	-1000.0000	.	+INF	.
BC .C	-1000.0000	.	+INF	.
CD .D	-1000.0000	-10.2462	+INF	.
DE .E	-1000.0000	-1000.0000	+INF	2.0360

---- EQU heat14

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.BCDE	-INF	-52.4184	1000.0000	.
ABCD .BCD	-INF	-2.4617	1000.0000	.
BCDE .CDE	-INF	-78.7164	1000.0000	.
ABC .BC	-INF	.	1000.0000	.
BCD .CD	-INF	-5.7933	1000.0000	.
CDE .DE	-INF	-78.7164	1000.0000	.
AB .B	-INF	.	1000.0000	.
BC .C	-INF	.	1000.0000	.
CD .D	-INF	-10.2462	1000.0000	.
DE .E	-INF	1000.0000	1000.0000	.

---- EQU Area1

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1	.	.	.	EPS
ABCDE.t2	.	.	.	EPS
ABCDE.t3	.	.	.	EPS
ABCDE.t4	.	.	.	EPS
ABCDE.t5	.	.	.	EPS
ABCDE.t6	.	.	.	EPS
ABCDE.t7	.	.	.	0.2548
ABCDE.t8	.	.	.	EPS
ABCDE.t9	.	.	.	EPS
ABCDE.t10	.	.	.	EPS
ABCD .t11	.	.	.	0.2548
ABCD .t12	.	.	.	EPS
ABCD .t13	.	.	.	EPS
ABCD .t14	.	.	.	EPS
ABCD .t15	.	.	.	EPS
ABCD .t16	.	.	.	EPS

BCDE .t17	.	.	.	EPS
BCDE .t18	.	.	.	EPS
BCDE .t19	.	.	.	EPS
BCDE .t20	.	.	.	EPS
BCDE .t21	.	.	.	0.2548
BCDE .t22	.	.	.	EPS
ABC .t23	.	.	.	EPS
ABC .t24	.	.	.	EPS
ABC .t25	.	.	.	EPS
BCD .t26	.	.	.	0.2548
BCD .t27	.	.	.	EPS
BCD .t28	.	.	.	EPS
CDE .t29	.	.	.	EPS
CDE .t30	.	.	.	EPS
CDE .t31	.	.	.	EPS
AB .t32	.	.	.	EPS
BC .t33	.	.	.	EPS
CD .t34	.	.	.	0.2548
DE .t35	.	.	.	0.2548

---- EQU Area2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1	-1000.0000	-11.3111	+INF	.
ABCDE.t2	-1000.0000	-2.4491	+INF	.
ABCDE.t3	-1000.0000	-14.1583	+INF	.
ABCDE.t4	-1000.0000	-1.0038	+INF	.
ABCDE.t5	-1000.0000	-8.4173	+INF	.
ABCDE.t6	-1000.0000	-53.8770	+INF	.
ABCDE.t7	-1000.0000	-1000.0000	+INF	0.2548
ABCDE.t8	-1000.0000	-5.2931	+INF	.
ABCDE.t9	-1000.0000	-24.4462	+INF	.
ABCDE.t10	-1000.0000	-59.6407	+INF	.
ABCD .t11	-1000.0000	-1000.0000	+INF	0.2548
ABCD .t12	-1000.0000	12.4083	+INF	.
ABCD .t13	-1000.0000	-3.9866	+INF	.
ABCD .t14	-1000.0000	14.4318	+INF	.
ABCD .t15	-1000.0000	4.0517	+INF	.
ABCD .t16	-1000.0000	-59.5991	+INF	.
BCDE .t17	-1000.0000	28.6488	+INF	.
BCDE .t18	-1000.0000	44.6356	+INF	.
BCDE .t19	-1000.0000	-81.9557	+INF	.
BCDE .t20	-1000.0000	53.3358	+INF	.
BCDE .t21	-1000.0000	-1000.0000	+INF	0.2548
BCDE .t22	-1000.0000	-98.0059	+INF	.
ABC .t23	-1000.0000	-27.5583	+INF	.
ABC .t24	-1000.0000	-18.4592	+INF	.
ABC .t25	-1000.0000	-30.4817	+INF	.
BCD .t26	-1000.0000	-1000.0000	+INF	0.2548
BCD .t27	-1000.0000	10.1825	+INF	.
BCD .t28	-1000.0000	-70.4473	+INF	.
CDE .t29	-1000.0000	-3.5632	+INF	.
CDE .t30	-1000.0000	-2.0522	+INF	.
CDE .t31	-1000.0000	-3.8590	+INF	.
AB .t32	-1000.0000	-27.5583	+INF	.
BC .t33	-1000.0000	-14.4448	+INF	.
CD .t34	-1000.0000	-1000.0000	+INF	0.2548
DE .t35	-1000.0000	-1000.0000	+INF	0.2548

---- EQU Area4

	LOWER	LEVEL	UPPER	MARGINAL

ABCDE	-1000.0000	-1000.0000	+INF	2.4252
ABCD	-1000.0000	-1000.0000	+INF	4.5502
BCDE	-1000.0000	-1000.0000	+INF	7.3919
ABC	-1000.0000	-4.0826	+INF	.
BCD	-1000.0000	-1000.0000	+INF	5.1526
CDE	-1000.0000	-5.3243	+INF	.
AB	-1000.0000	-4.0826	+INF	.
BC	-1000.0000	-5.8624	+INF	.
CD	-1000.0000	-1000.0000	+INF	12.5227
DE	-1000.0000	-1000.0000	+INF	15.3122

---- EQU Area5

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	+INF	4.0686
ABCD	.	.	+INF	7.6335
BCDE	.	1.1611	+INF	.
ABC	.	2.0000	+INF	EPS
BCD	.	.	+INF	8.6442
CDE	.	3.2333	+INF	.
AB	.	2.0000	+INF	EPS
BC	.	2.0000	+INF	EPS
CD	.	0.4518	+INF	.
DE	.	3.2333	+INF	.

---- EQU Area6

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	+INF	.
ABCD	.	1.1611	+INF	.
BCDE	.	.	+INF	12.4008
ABC	.	3.6257	+INF	.
BCD	.	1.6076	+INF	.
CDE	.	.	+INF	EPS
AB	.	3.6257	+INF	.
BC	.	4.0594	+INF	.
CD	.	.	+INF	21.0084
DE	.	.	+INF	25.6882

---- EQU Coste1

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	0.0571	0.0571	0.0571	7.9446
ABCD	0.0571	0.0571	0.0571	19.5583
BCDE	0.0571	0.0571	0.0571	33.0449
ABC	0.0571	0.0571	0.0571	EPS
BCD	0.0571	0.0571	0.0571	22.4817
CDE	0.0571	0.0571	0.0571	EPS
AB	0.0571	0.0571	0.0571	EPS
BC	0.0571	0.0571	0.0571	EPS
CD	0.0571	0.0571	0.0571	63.2631
DE	0.0571	0.0571	0.0571	69.1810

---- EQU Coste2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1	-41.3522	6.6205	+INF	.
ABCDE.t2	-48.9348	6.6205	+INF	.

ABCDE.t3	-38.9161	6.6205	+INF	.
ABCDE.t4	-50.1714	6.6205	+INF	.
ABCDE.t5	-43.8282	6.6205	+INF	.
ABCDE.t6	-4.9316	6.6205	+INF	.
ABCDE.t7	-51.0303	-51.0303	+INF	0.1740
ABCDE.t8	-46.5014	6.6205	+INF	.
ABCDE.t9	-30.1134	6.6205	+INF	.
ABCDE.t10	.	6.6205	+INF	.
ABCD .t11	-41.3522	-41.3522	+INF	0.2220
ABCD .t12	-48.9348	16.2986	+INF	.
ABCD .t13	-38.9161	16.2986	+INF	.
ABCD .t14	-50.1714	16.2986	+INF	.
ABCD .t15	-43.8282	16.2986	+INF	.
ABCD .t16	-4.9316	16.2986	+INF	.
BCDE .t17	-38.9161	27.5374	+INF	.
BCDE .t18	-43.8282	27.5374	+INF	.
BCDE .t19	-4.9316	27.5374	+INF	.
BCDE .t20	-46.5014	27.5374	+INF	.
BCDE .t21	-30.1134	-30.1134	+INF	0.4139
BCDE .t22	.	27.5374	+INF	.
ABC .t23	-41.3522	.	+INF	.
ABC .t24	-48.9348	-1.90657E-20	+INF	.
ABC .t25	-38.9161	.	+INF	.
BCD .t26	-38.9161	-38.9161	+INF	0.2699
BCD .t27	-43.8282	18.7347	+INF	.
BCD .t28	-4.9316	18.7347	+INF	.
CDE .t29	-4.9316	.	+INF	.
CDE .t30	-30.1134	.	+INF	.
CDE .t31	.	.	+INF	0.0734
AB .t32	-41.3522	.	+INF	.
BC .t33	-38.9161	.	+INF	.
CD .t34	-4.9316	-4.9316	+INF	0.2404
DE .t35	.	.	+INF	0.6754

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU Coste3	.	.	.	1.0000

---- EQU Coste4

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-14.4693	-14.4693	+INF	4.2200
ABCD	-14.4693	-14.4693	+INF	4.2200
BCDE	-14.4693	-14.4693	+INF	4.2200
ABC	-14.4693	-4.96064E-21	+INF	.
BCD	-14.4693	-14.4693	+INF	4.2200
CDE	-14.4693	.	+INF	.
AB	-14.4693	-2.04214E-20	+INF	.
BC	-14.4693	.	+INF	.
CD	-14.4693	-14.4693	+INF	4.2200
DE	-14.4693	-14.4693	+INF	4.2200

---- EQU Coste5

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	1.0000
ABCD	.	.	.	1.0000
BCDE	.	.	.	1.0000
ABC	.	.	.	1.0000
BCD	.	.	.	1.0000
CDE	.	.	.	1.0000

AB	.	.	.	1.0000
BC	.	.	.	1.0000
CD	.	.	.	1.0000
DE	.	.	.	1.0000

---- VAR y task t exists

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	1.0000	77564.2292
t2	.	.	1.0000	55708.7632
t3	.	.	1.0000	EPS
t4	.	.	1.0000	55708.7632
t5	.	.	1.0000	EPS
t6	.	.	1.0000	57254.6557
t7	.	1.0000	1.0000	76575.1967
t8	.	.	1.0000	EPS
t9	.	.	1.0000	57254.6557
t10	.	.	1.0000	1541.6586
t11	.	1.0000	1.0000	27081.7367
t12	.	.	1.0000	EPS
t13	.	.	1.0000	EPS
t14	.	.	1.0000	EPS
t15	.	.	1.0000	EPS
t16	.	.	1.0000	EPS
t17	.	.	1.0000	-21624.4660
t18	.	.	1.0000	EPS
t19	.	.	1.0000	57254.6557
t20	.	.	1.0000	EPS
t21	.	1.0000	1.0000	83153.0373
t22	.	.	1.0000	1541.6586
t23	.	.	1.0000	21855.4660
t24	.	.	1.0000	EPS
t25	.	.	1.0000	EPS
t26	.	1.0000	1.0000	EPS
t27	.	.	1.0000	EPS
t28	.	.	1.0000	EPS
t29	.	.	1.0000	EPS
t30	.	.	1.0000	EPS
t31	.	.	1.0000	EPS
t32	.	.	1.0000	EPS
t33	.	.	1.0000	-21779.4592
t34	.	1.0000	1.0000	EPS
t35	.	1.0000	1.0000	EPS

---- VAR W idem that Wbin but used to relax integrality of Wbin

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	1.5000
ABCD	.	.	.	-84.1890
BCDE	.	.	.	-524.3916
ABC	.	.	.	-7.8541
BCD	.	.	.	-84.1890
CDE	.	.	.	-459.2582
AB	.	.	.	-7.8541
BC	.	.	.	-7.8541
CD	.	.	.	-427.6139
DE	.	.	.	-459.2582
A	1.0000	1.0000	1.0000	52.1667
B	.	1.0000	1.0000	.
C	.	1.0000	1.0000	.
D	.	.	1.0000	.

E	1.0000	1.0000	1.0000	2037.5000

---- VAR z state s exists view note

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.0000	1.0000	.
ABCD	.	1.0000	1.0000	.
BCDE	.	1.0000	1.0000	.
ABC	.	.	1.0000	.
BCD	.	1.0000	1.0000	.
CDE	.	.	1.0000	.
AB	.	.	1.0000	.
BC	.	.	1.0000	.
CD	.	1.0000	1.0000	.
DE	.	1.0000	1.0000	.

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR zobj	-INF	419.8011	+INF	.
---- VAR zobj2	-INF	161.9090	+INF	.

zobj objective function

---- VAR V1

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.1611	20.0000	.
ABCD	.	1.6257	20.0000	.
BCDE	.	2.0722	20.0000	.
ABC	.	1.6257	20.0000	.
BCD	.	2.0594	20.0000	.
CDE	.	.	20.0000	25.1041
AB	.	1.6257	20.0000	.
BC	.	2.0594	20.0000	.
CD	.	1.3437	20.0000	.
DE	.	1.7955	20.0000	.

---- VAR V2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.1611	20.0000	.
ABCD	.	0.4646	20.0000	.
BCDE	.	3.2333	20.0000	.
ABC	.	.	20.0000	.
BCD	.	0.4518	20.0000	.
CDE	.	3.2333	20.0000	.
AB	.	.	20.0000	0.9354
BC	.	.	20.0000	0.9354
CD	.	1.7955	20.0000	.
DE	.	5.0288	20.0000	.

---- VAR L1

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	0.4040	20.0000	.
ABCD	.	1.0257	20.0000	.
BCDE	.	1.4743	20.0000	.
ABC	.	1.0257	20.0000	.
BCD	.	1.6594	20.0000	.

CDE	.	.	20.0000	21.9397
AB	.	1.0257	20.0000	.
BC	.	1.6594	20.0000	.
CD	.	1.1437	20.0000	.
DE	.	1.5505	20.0000	.

---- VAR L2 total flows (kmol/h) of vapor and liquid in rec and str sections

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	2.4040	20.0000	.
ABCD	.	0.6217	20.0000	.
BCDE	.	3.8784	20.0000	.
ABC	.	.	20.0000	.
BCD	.	0.8067	20.0000	.
CDE	.	3.8784	20.0000	.
AB	.	.	20.0000	.
BC	.	.	20.0000	EPS
CD	.	1.9505	20.0000	.
DE	.	5.4288	20.0000	.

---- VAR F

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	2.0000	2.0000	.
ABCD	.	0.7571	2.0000	.
BCDE	.	1.2429	2.0000	.
ABC	.	0.6000	2.0000	.
BCD	.	0.7549	2.0000	.
CDE	.	0.6451	2.0000	.
AB	.	0.6000	2.0000	.
BC	.	0.4000	2.0000	.
CD	.	0.3549	2.0000	.
DE	.	0.6451	2.0000	.

---- VAR D

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	0.7571	2.0000	.
ABCD	.	0.6000	2.0000	.
BCDE	.	0.5979	2.0000	.
ABC	.	0.6000	2.0000	.
BCD	.	0.4000	2.0000	.
CDE	.	.	2.0000	0.3798
AB	.	0.6000	2.0000	.
BC	.	0.4000	2.0000	.
CD	.	0.2000	2.0000	.
DE	.	0.2451	2.0000	.

---- VAR B total flows (kmol/h) of feed, distillate and bottoms

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.2429	2.0000	.
ABCD	.	0.1571	2.0000	.
BCDE	.	0.6451	2.0000	.
ABC	.	.	2.0000	EPS
BCD	.	0.3549	2.0000	.
CDE	.	0.6451	2.0000	.
AB	.	.	2.0000	.
BC	.	.	2.0000	39.4088

CD	.	0.1549	2.0000	.
DE	.	0.4000	2.0000	.

---- VAR Fi

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	.	0.6000	0.6000	.
ABCDE.B	.	0.4000	0.4000	.
ABCDE.C	.	0.2000	0.2000	.
ABCDE.D	.	0.4000	0.4000	.
ABCDE.E	.	0.4000	0.4000	.
ABCD .A	.	0.6000	0.6000	.
ABCD .B	.	0.1280	0.4000	.
ABCD .C	.	0.0160	0.2000	.
ABCD .D	.	0.0131	0.4000	.
ABCD .E	.	.	0.4000	.
BCDE .A	.	.	0.6000	.
BCDE .B	.	0.2720	0.4000	.
BCDE .C	.	0.1840	0.2000	.
BCDE .D	.	0.3869	0.4000	.
BCDE .E	.	0.4000	0.4000	.
ABC .A	.	0.6000	0.6000	.
ABC .B	.	.	0.4000	.
ABC .C	.	.	0.2000	.
ABC .D	.	.	0.4000	14.5520
ABC .E	.	.	0.4000	17.2131
BCD .A	.	.	0.6000	.
BCD .B	.	0.4000	0.4000	.
BCD .C	.	0.2000	0.2000	.
BCD .D	.	0.1549	0.4000	.
BCD .E	.	.	0.4000	.
CDE .A	.	.	0.6000	.
CDE .B	.	.	0.4000	.
CDE .C	.	.	0.2000	.
CDE .D	.	0.2451	0.4000	.
CDE .E	.	0.4000	0.4000	.
AB .A	.	0.6000	0.6000	EPS
AB .B	.	.	0.4000	.
AB .C	.	.	0.2000	.
AB .D	.	.	0.4000	.
AB .E	.	.	0.4000	.
BC .A	.	.	0.6000	.
BC .B	.	0.4000	0.4000	.
BC .C	.	.	0.2000	.
BC .D	.	.	0.4000	.
BC .E	.	.	0.4000	.
CD .A	.	.	0.6000	.
CD .B	.	.	0.4000	.
CD .C	.	0.2000	0.2000	.
CD .D	.	0.1549	0.4000	.
CD .E	.	.	0.4000	.
DE .A	.	.	0.6000	68.8595
DE .B	.	.	0.4000	.
DE .C	.	.	0.2000	98.2469
DE .D	.	0.2451	0.4000	.
DE .E	.	0.4000	0.4000	.

---- VAR Di

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	.	0.6000	0.6000	.

ABCDE.B	.	0.1280	0.4000	.
ABCDE.C	.	0.0160	0.2000	.
ABCDE.D	.	0.0131	0.4000	.
ABCDE.E	.	.	0.4000	.
ABCD .A	.	0.6000	0.6000	.
ABCD .B	.	.	0.4000	.
ABCD .C	.	.	0.2000	.
ABCD .D	.	.	0.4000	.
ABCD .E	.	.	0.4000	.
BCDE .A	.	.	0.6000	89.8261
BCDE .B	.	0.2720	0.4000	.
BCDE .C	.	0.1840	0.2000	.
BCDE .D	.	0.1419	0.4000	.
BCDE .E	.	.	0.4000	.
ABC .A	.	0.6000	0.6000	.
ABC .B	.	.	0.4000	.
ABC .C	.	.	0.2000	.
ABC .D	.	.	0.4000	.
ABC .E	.	.	0.4000	.
BCD .A	.	.	0.6000	1.4670
BCD .B	.	0.4000	0.4000	.
BCD .C	.	.	0.2000	.
BCD .D	.	.	0.4000	13.5989
BCD .E	.	.	0.4000	16.5930
CDE .A	.	.	0.6000	34.4991
CDE .B	.	.	0.4000	60.6929
CDE .C	.	.	0.2000	61.7323
CDE .D	.	.	0.4000	0.3265
CDE .E	.	.	0.4000	.
AB .A	.	0.6000	0.6000	-0.1993
AB .B	.	.	0.4000	.
AB .C	.	.	0.2000	0.1969
AB .D	.	.	0.4000	0.2998
AB .E	.	.	0.4000	0.4209
BC .A	.	.	0.6000	.
BC .B	.	0.4000	0.4000	.
BC .C	.	.	0.2000	0.3741
BC .D	.	.	0.4000	0.5697
BC .E	.	.	0.4000	0.7998
CD .A	.	.	0.6000	25.6453
CD .B	.	.	0.4000	.
CD .C	.	0.2000	0.2000	.
CD .D	.	.	0.4000	59.5803
CD .E	.	.	0.4000	61.2182
DE .A	.	.	0.6000	0.6074
DE .B	.	.	0.4000	.
DE .C	.	.	0.2000	96.2537
DE .D	.	0.2451	0.4000	.
DE .E	.	.	0.4000	.

---- VAR Bi individual flows (kmol/h) of feed, distillate and bottoms

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	.	.	0.6000	.
ABCDE.B	.	0.2720	0.4000	.
ABCDE.C	.	0.1840	0.2000	.
ABCDE.D	.	0.3869	0.4000	.
ABCDE.E	.	0.4000	0.4000	.
ABCD .A	.	.	0.6000	EPS
ABCD .B	.	0.1280	0.4000	.
ABCD .C	.	0.0160	0.2000	.
ABCD .D	.	0.0131	0.4000	.

ABCD .E	.	.	0.4000	.
BCDE .A	.	.	0.6000	.
BCDE .B	.	.	0.4000	.
BCDE .C	.	.	0.2000	.
BCDE .D	.	0.2451	0.4000	.
BCDE .E	.	0.4000	0.4000	.
ABC .A	.	.	0.6000	EPS
ABC .B	.	.	0.4000	EPS
ABC .C	.	.	0.2000	.
ABC .D	.	.	0.4000	EPS
ABC .E	.	.	0.4000	.
BCD .A	.	.	0.6000	.
BCD .B	.	.	0.4000	.
BCD .C	.	0.2000	0.2000	.
BCD .D	.	0.1549	0.4000	.
BCD .E	.	.	0.4000	.
CDE .A	.	.	0.6000	.
CDE .B	.	.	0.4000	90.3242
CDE .C	.	.	0.2000	.
CDE .D	.	0.2451	0.4000	.
CDE .E	.	0.4000	0.4000	.
AB .A	.	.	0.6000	EPS
AB .B	.	.	0.4000	EPS
AB .C	.	.	0.2000	EPS
AB .D	.	.	0.4000	EPS
AB .E	.	.	0.4000	.
BC .A	.	.	0.6000	EPS
BC .B	.	.	0.4000	.
BC .C	.	.	0.2000	EPS
BC .D	.	.	0.4000	EPS
BC .E	.	.	0.4000	EPS
CD .A	.	.	0.6000	0.0717
CD .B	.	.	0.4000	.
CD .C	.	.	0.2000	.
CD .D	.	0.1549	0.4000	.
CD .E	.	.	0.4000	.
DE .A	.	.	0.6000	.
DE .B	.	.	0.4000	.
DE .C	.	.	0.2000	.
DE .D	.	.	0.4000	.
DE .E	.	0.4000	0.4000	.

---- VAR rud Underwood root

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	4.0500	5.6521	10.4900	.
ABCDE.r2	1.7700	2.2265	4.0300	.
ABCDE.r3	1.3200	1.5437	1.7500	.
ABCDE.r4	1.0100	1.0954	1.3000	.
ABCD .r1	4.0500	5.6521	10.4900	.
ABCD .r2	1.7700	2.2265	4.0300	.
ABCD .r3	1.3200	1.5437	1.7500	.
BCDE .r2	1.7700	2.2265	4.0300	.
BCDE .r3	1.3200	1.5437	1.7500	.
BCDE .r4	1.0100	1.0954	1.3000	.
ABC .r1	4.0500	7.2700	10.4900	EPS
ABC .r2	1.7700	2.9000	4.0300	EPS
BCD .r2	1.7700	3.0984	4.0300	.
BCD .r3	1.3200	1.5379	1.7500	.
CDE .r3	1.3200	1.3200	1.7500	EPS
CDE .r4	1.0100	1.0100	1.3000	EPS
AB .r1	4.0500	7.2700	10.4900	EPS

BC	.r2	1.7700	2.9000	4.0300	EPS
CD	.r3	1.3200	1.4457	1.7500	.
DE	.r4	1.0100	1.0954	1.3000	.

---- VAR WR

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	1.0000	EPS
ABCD	.	.	1.0000	EPS
BCDE	.	.	1.0000	EPS
ABC	.	.	1.0000	EPS
BCD	.	.	1.0000	EPS
CDE	.	.	1.0000	EPS
AB	.	.	1.0000	EPS
BC	.	.	1.0000	EPS
CD	.	.	1.0000	EPS
DE	.	.	1.0000	EPS
A	.	.	1.0000	.
B	.	.	1.0000	.
C	.	.	1.0000	.
D	.	.	1.0000	.
E	.	1.0000	1.0000	.

---- VAR WC heat exchanger is a reboiler or a condenser

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	1.0000	.
ABCD	.	.	1.0000	.
BCDE	.	.	1.0000	.
ABC	.	.	1.0000	.
BCD	.	.	1.0000	.
CDE	.	.	1.0000	.
AB	.	.	1.0000	.
BC	.	.	1.0000	.
CD	.	.	1.0000	.
DE	.	.	1.0000	.
A	.	1.0000	1.0000	.
B	.	1.0000	1.0000	.
C	.	1.0000	1.0000	.
D	.	.	1.0000	.
E	.	.	1.0000	.

---- VAR Qreb

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	10.0000	81.4400
ABCD	.	.	10.0000	81.4400
BCDE	.	.	10.0000	81.4400
ABC	.	.	10.0000	81.4400
BCD	.	.	10.0000	81.4400
CDE	.	.	10.0000	81.4400
AB	.	.	10.0000	81.4400
BC	.	.	10.0000	81.4400
CD	.	.	10.0000	81.4400
DE	.	.	10.0000	81.4400
A	.	.	10.0000	81.4400
B	.	.	10.0000	81.4400
C	.	.	10.0000	81.4400
D	.	.	10.0000	81.4400
E	.	1.9260	10.0000	.

---- VAR Qcond Heat load in reboiler and condenser

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	10.0000	3.0400
ABCD	.	.	10.0000	3.0400
BCDE	.	.	10.0000	3.0400
ABC	.	.	10.0000	3.0400
BCD	.	.	10.0000	3.0400
CDE	.	.	10.0000	3.0400
AB	.	.	10.0000	3.0400
BC	.	.	10.0000	3.0400
CD	.	.	10.0000	3.0400
DE	.	.	10.0000	3.0400
A	.	0.5002	10.0000	.
B	.	0.6835	10.0000	.
C	.	0.4781	10.0000	.
D	.	.	10.0000	3.0400
E	.	.	10.0000	3.0400

---- VAR Ar Area of columns s

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	0.1000	1.9479	25.0000	.
ABCD	0.1000	2.7274	25.0000	.
BCDE	0.1000	5.4243	25.0000	.
ABC	0.1000	2.0000	25.0000	EPS
BCD	0.1000	3.4549	25.0000	.
CDE	0.1000	0.1000	25.0000	EPS
AB	0.1000	2.0000	25.0000	EPS
BC	0.1000	0.9478	25.0000	EPS
CD	0.1000	3.0122	25.0000	.
DE	0.1000	8.4365	25.0000	.

---- VAR Volumen Volumen in the column t

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	26.8402	+INF	.
t2	.	17.9782	+INF	.
t3	.	29.6874	+INF	.
t4	.	16.5330	+INF	.
t5	.	23.9465	+INF	.
t6	.	69.4061	+INF	.
t7	.	15.5291	+INF	.
t8	.	20.8222	+INF	.
t9	.	39.9754	+INF	.
t10	.	75.1698	+INF	.
t11	.	37.5806	+INF	.
t12	.	25.1723	+INF	.
t13	.	41.5672	+INF	.
t14	.	23.1488	+INF	.
t15	.	33.5289	+INF	.
t16	.	97.1797	+INF	.
t17	.	82.6705	+INF	.
t18	.	66.6837	+INF	.
t19	.	193.2750	+INF	.
t20	.	57.9835	+INF	.
t21	.	111.3193	+INF	.
t22	.	209.3252	+INF	.
t23	.	27.5583	+INF	.

t24	.	18.4592	+INF	.
t25	.	30.4817	+INF	.
t26	.	52.6553	+INF	.
t27	.	42.4728	+INF	.
t28	.	123.1026	+INF	.
t29	.	3.5632	+INF	.
t30	.	2.0522	+INF	.
t31	.	3.8590	+INF	.
t32	.	27.5583	+INF	.
t33	.	14.4448	+INF	.
t34	.	107.3307	+INF	.
t35	.	325.5690	+INF	.

---- VAR Vol Volume of the task s

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	15.5291	+INF	.
ABCD	.	37.5806	+INF	.
BCDE	.	111.3193	+INF	.
ABC	.	.	+INF	EPS
BCD	.	52.6553	+INF	.
CDE	.	.	+INF	EPS
AB	.	.	+INF	EPS
BC	.	.	+INF	EPS
CD	.	107.3307	+INF	.
DE	.	325.5690	+INF	.

---- VAR Cpisos Related to cost estimation

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	0.1450	+INF	.
ABCD	.	0.1850	+INF	.
BCDE	.	0.3449	+INF	.
ABC	.	0.1476	+INF	.
BCD	.	0.2249	+INF	.
CDE	.	0.0612	+INF	.
AB	.	0.1476	+INF	.
BC	.	0.0977	+INF	.
CD	.	0.2004	+INF	.
DE	.	0.5628	+INF	.
A	.	.	+INF	EPS
B	.	.	+INF	EPS
C	.	.	+INF	EPS
D	.	.	+INF	EPS
E	.	.	+INF	EPS

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR CostPisos	.	72.8365	+INF	.

---- VAR CP

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.4683	100.0000	.
ABCD	.	2.7998	100.0000	.
BCDE	.	7.2522	100.0000	.
ABC	.	.	100.0000	4.2200
BCD	.	3.7100	100.0000	.
CDE	.	.	100.0000	4.2200
AB	.	.	100.0000	4.2200

BC	.	.	100.0000	4.2200
CD	.	7.0113	100.0000	.
DE	.	20.1886	100.0000	.

---- VAR CostColumn

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	6.1964	1000.0000	.
ABCD	.	11.8152	1000.0000	.
BCDE	.	30.6041	1000.0000	.
ABC	.	.	1000.0000	.
BCD	.	15.6563	1000.0000	.
CDE	.	.	1000.0000	.
AB	.	.	1000.0000	.
BC	.	.	1000.0000	.
CD	.	29.5878	1000.0000	.
DE	.	85.1957	1000.0000	.
A	.	.	1000.0000	1.0000
B	.	.	1000.0000	1.0000
C	.	.	1000.0000	1.0000
D	.	.	1000.0000	1.0000
E	.	.	1000.0000	1.0000

---- VAR NumPisos

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	6.6205	+INF	.
ABCD	.	16.2986	+INF	.
BCDE	.	27.5374	+INF	.
ABC	.	.	+INF	0.1771
BCD	.	18.7347	+INF	.
CDE	.	.	+INF	.
AB	.	.	+INF	0.1771
BC	.	.	+INF	0.1173
CD	.	52.7192	+INF	.
DE	.	57.6508	+INF	.
A	.	.	+INF	EPS
B	.	.	+INF	EPS
C	.	.	+INF	EPS
D	.	.	+INF	EPS
E	.	.	+INF	EPS

---- VAR VV max of V1 and V2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.1611	50.0000	.
ABCD	.	1.6257	50.0000	.
BCDE	.	3.2333	50.0000	.
ABC	.	3.6257	50.0000	.
BCD	.	2.0594	50.0000	.
CDE	.	3.2333	50.0000	.
AB	.	3.6257	50.0000	.
BC	.	4.0594	50.0000	.
CD	.	1.7955	50.0000	.
DE	.	5.0288	50.0000	.

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

```
                            0     ERRORS
                           77  PROJECTED
GAMS 38.2.1  96226ea8 Feb 19, 2022          LEX-LEG x86 64bit/Linux - 04/25/25 04:51:21 Page 5
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 TCD2 Using MINLP From line 815


MODEL STATISTICS

BLOCKS OF EQUATIONS          91     SINGLE EQUATIONS        1,311
BLOCKS OF VARIABLES          30     SINGLE VARIABLES          498
NON ZERO ELEMENTS         4,863     NON LINEAR N-Z            840
CODE LENGTH               3,368     CONSTANT POOL              30     DISCRETE VARIABLES
   50


GENERATION TIME      =        0.005 SECONDS      5 MB  38.2.1 96226ea8 LEX-LEG
GAMS 38.2.1  96226ea8 Feb 19, 2022          LEX-LEG x86 64bit/Linux - 04/25/25 04:51:21 Page 6
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 TCD2 Using MINLP From line 815


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

     MODEL   TCD2                OBJECTIVE  zobj
     TYPE    MINLP               DIRECTION  MINIMIZE
     SOLVER  SBB                 FROM LINE  815

**** SOLVER STATUS     1 Normal Completion
**** MODEL STATUS      8 Integer Solution
**** OBJECTIVE VALUE               383.3698

 RESOURCE USAGE, LIMIT          1.277  10000000.000
 ITERATION COUNT, LIMIT      1972     100000000
 EVALUATION ERRORS              0             0


    C O N O P T 3   version 3.17K
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                    Bagsvaerdvej 246 A
                    DK-2880 Bagsvaerd, Denmark


    The model has 498 variables and 1311 constraints
    with 4863 Jacobian elements, 840 of which are nonlinear.
    The Hessian of the Lagrangian has 30 elements on the diagonal,
    435 elements below the diagonal, and 270 nonlinear variables.

                  Pre-triangular equations:   125
                  Post-triangular equations:  406
                  Definitional equations:     53


 ** Optimal solution. Reduced gradient less than tolerance.


 CONOPT time Total                            0.087 seconds
   of which: Function evaluations             0.027 = 31.0%
             1st Derivative evaluations       0.004 =  4.6%


 ^^^ Detailed root node information above.
```

```
 Integer solution
 Statistics:
    B&B nodes     :               22
    MIP solution  :       383.369803 found in node 19
    Best possible :       383.369803
    Absolute gap  :         0.000000     optca :  0.000000
    Relative gap  :         0.000000     optcr :  0.000000
    Model Status  :                8
    Solver Status :                1

---- EQU logic1

             LOWER          LEVEL          UPPER         MARGINAL

ABCDE        -INF            1.0000         1.0000          .
ABCD         -INF            1.0000         1.0000          .
BCDE         -INF            1.0000         1.0000          .
ABC          -INF             .             1.0000          .
BCD          -INF            1.0000         1.0000          .
CDE          -INF             .             1.0000          .
AB           -INF             .             1.0000          .
BC           -INF             .             1.0000          .
CD           -INF            1.0000         1.0000          .
DE           -INF            1.0000         1.0000          .

---- EQU logic2

            LOWER          LEVEL          UPPER         MARGINAL

ABCD        -INF            1.0000         1.0000          .
ABC         -INF             .             1.0000          .
BCD         -INF            1.0000         1.0000          .
AB          -INF             .             1.0000          .
BC          -INF             .             1.0000          .
CD          -INF             .             1.0000          .

---- EQU logic3

            LOWER          LEVEL          UPPER         MARGINAL

BCDE        -INF            1.0000         1.0000          .
BCD         -INF            1.0000         1.0000          .
CDE         -INF             .             1.0000          .
BC          -INF             .             1.0000          .
CD          -INF            1.0000         1.0000          .
DE          -INF            1.0000         1.0000          .

---- EQU logic4

          LOWER          LEVEL          UPPER         MARGINAL

A          1.0000         1.0000        +INF             .
B          1.0000         1.0000        +INF             .
C          1.0000         1.0000        +INF             .
D          1.0000         2.0000        +INF             .
E          1.0000         1.0000        +INF             .

---- EQU logic5

          LOWER          LEVEL          UPPER         MARGINAL

A         -INF            1.0000         1.0000          .
B         -INF            1.0000         1.0000          .
```

C	-INF	1.0000	1.0000	.
D	-INF	1.0000	1.0000	.

---- EQU logic6

	LOWER	LEVEL	UPPER	MARGINAL
B	-INF	.	1.0000	.
C	-INF	.	1.0000	.
D	-INF	1.0000	1.0000	.
E	-INF	1.0000	1.0000	.

---- EQU logic7

	LOWER	LEVEL	UPPER	MARGINAL
A	1.0000	2.0000	+INF	.
B	1.0000	2.0000	+INF	.
C	1.0000	2.0000	+INF	.
D	1.0000	1.0000	+INF	.
E	1.0000	1.0000	+INF	.

---- EQU logic8

	LOWER	LEVEL	UPPER	MARGINAL
A	1.0000	1.0000	+INF	.
B	1.0000	1.0000	+INF	77.5000
C	1.0000	1.0000	+INF	153.5000
D	1.0000	1.0000	+INF	.
E	1.0000	2.0000	+INF	.

---- EQU logic9

	LOWER	LEVEL	UPPER	MARGINAL
B.t17.t32	-2.0000	-1.0000	+INF	.
B.t26.t32	-2.0000	-2.0000	+INF	.
B.t33.t32	-2.0000	-1.0000	+INF	.
C.t29.t25	-2.0000	-1.0000	+INF	.
C.t29.t33	-2.0000	-1.0000	+INF	.
C.t34.t25	-2.0000	-2.0000	+INF	.
C.t34.t33	-2.0000	-2.0000	+INF	.
D.t35.t16	-2.0000	-1.0000	+INF	.
D.t35.t28	-2.0000	-1.0000	+INF	.
D.t35.t34	-2.0000	-2.0000	+INF	.

---- EQU logic10

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	.	+INF	.
BCDE	.	.	+INF	.
ABC	.	.	+INF	7.8541
BCD	.	2.0000	+INF	.
CDE	.	.	+INF	306.7659
AB	.	.	+INF	7.8541
BC	.	.	+INF	8.5898
CD	.	1.0000	+INF	.
DE	.	.	+INF	.

---- EQU logic11

	LOWER	LEVEL	UPPER	MARGINAL
BCD.t11.t20	-2.0000	-1.0000	+INF	.
BCD.t11.t21	-2.0000	-2.0000	+INF	.
BCD.t11.t22	-2.0000	-1.0000	+INF	.
BCD.t12.t20	-2.0000	.	+INF	.
BCD.t12.t21	-2.0000	-1.0000	+INF	.
BCD.t12.t22	-2.0000	.	+INF	.
BCD.t14.t20	-2.0000	.	+INF	.
BCD.t14.t21	-2.0000	-1.0000	+INF	.
BCD.t14.t22	-2.0000	.	+INF	.
BC .t18.t23	-2.0000	.	+INF	.
BC .t18.t24	-2.0000	.	+INF	.
BC .t19.t23	-2.0000	.	+INF	.
BC .t19.t24	-2.0000	.	+INF	.
BC .t27.t23	-2.0000	.	+INF	.
BC .t27.t24	-2.0000	.	+INF	.
BC .t28.t23	-2.0000	.	+INF	.
BC .t28.t24	-2.0000	.	+INF	.
CD .t30.t13	-2.0000	.	+INF	.
CD .t30.t15	-2.0000	.	+INF	.
CD .t30.t26	-2.0000	-1.0000	+INF	.
CD .t30.t27	-2.0000	.	+INF	.
CD .t31.t13	-2.0000	.	+INF	.
CD .t31.t15	-2.0000	.	+INF	.
CD .t31.t26	-2.0000	-1.0000	+INF	.
CD .t31.t27	-2.0000	.	+INF	.

---- EQU logic12

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.t7	.	.	+INF	.
ABCD.t8	.	1.0000	+INF	.
ABCD.t9	.	1.0000	+INF	.
ABCD.t10	.	1.0000	+INF	.
BCDE.t1	.	1.0000	+INF	.
BCDE.t2	.	1.0000	+INF	.
BCDE.t4	.	1.0000	+INF	.
BCDE.t7	.	.	+INF	.
ABC .t4	.	.	+INF	.
ABC .t5	.	.	+INF	.
ABC .t6	.	.	+INF	.
ABC .t14	.	.	+INF	.
ABC .t15	.	.	+INF	.
ABC .t16	.	.	+INF	.
BCD .t11	.	.	+INF	.
BCD .t12	.	1.0000	+INF	.
BCD .t14	.	1.0000	+INF	.
BCD .t20	.	1.0000	+INF	.
BCD .t21	.	.	+INF	.
BCD .t22	.	1.0000	+INF	.
CDE .t3	.	.	+INF	.
CDE .t5	.	.	+INF	.
CDE .t8	.	.	+INF	.
CDE .t17	.	.	+INF	.
CDE .t18	.	.	+INF	.
CDE .t20	.	.	+INF	.
AB .t2	.	.	+INF	.
AB .t3	.	.	+INF	.
AB .t12	.	.	+INF	.
AB .t13	.	.	+INF	.
AB .t24	.	.	+INF	.

AB .t25	.	.	+INF	.
BC .t18	.	.	+INF	.
BC .t19	.	.	+INF	.
BC .t23	.	.	+INF	.
BC .t24	.	.	+INF	.
BC .t27	.	.	+INF	.
BC .t28	.	.	+INF	.
CD .t13	.	1.0000	+INF	.
CD .t15	.	1.0000	+INF	.
CD .t26	.	.	+INF	.
CD .t27	.	1.0000	+INF	.
CD .t30	.	1.0000	+INF	.
CD .t31	.	1.0000	+INF	.
DE .t6	.	1.0000	+INF	.
DE .t9	.	1.0000	+INF	.
DE .t19	.	1.0000	+INF	.
DE .t21	.	.	+INF	.
DE .t29	.	1.0000	+INF	.
DE .t30	.	1.0000	+INF	.

---- EQU logic13

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.t11	.	.	+INF	.
ABCD.t12	.	1.0000	+INF	.
ABCD.t13	.	1.0000	+INF	.
ABCD.t14	.	1.0000	+INF	.
ABCD.t15	.	1.0000	+INF	.
ABCD.t16	.	1.0000	+INF	.
BCDE.t17	.	1.0000	+INF	.
BCDE.t18	.	1.0000	+INF	.
BCDE.t19	.	1.0000	+INF	.
BCDE.t20	.	1.0000	+INF	.
BCDE.t21	.	.	+INF	.
BCDE.t22	.	1.0000	+INF	.
ABC .t23	.	.	+INF	.
ABC .t24	.	.	+INF	.
ABC .t25	.	.	+INF	.
BCD .t26	.	1.0000	+INF	.
BCD .t27	.	2.0000	+INF	.
BCD .t28	.	2.0000	+INF	.
CDE .t29	.	.	+INF	.
CDE .t30	.	.	+INF	.
CDE .t31	.	.	+INF	.
AB .t32	.	.	+INF	.
BC .t33	.	.	+INF	.
CD .t34	.	.	+INF	.
DE .t35	.	.	+INF	.

---- EQU logic14

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1	.	1.0000	+INF	.
ABCDE.t2	.	1.0000	+INF	.
ABCDE.t3	.	1.0000	+INF	.
ABCDE.t4	.	1.0000	+INF	.
ABCDE.t5	.	1.0000	+INF	.
ABCDE.t6	.	1.0000	+INF	.
ABCDE.t7	.	.	+INF	11400.3198
ABCDE.t8	.	1.0000	+INF	.
ABCDE.t9	.	1.0000	+INF	.

ABCDE.t10	.	1.0000	+INF	.
ABCD .t11	.	.	+INF	7780.3742
ABCD .t12	.	1.0000	+INF	.
ABCD .t13	.	1.0000	+INF	.
ABCD .t14	.	1.0000	+INF	.
ABCD .t15	.	1.0000	+INF	.
ABCD .t16	.	1.0000	+INF	.
BCDE .t17	.	1.0000	+INF	.
BCDE .t18	.	1.0000	+INF	.
BCDE .t19	.	1.0000	+INF	.
BCDE .t20	.	1.0000	+INF	.
BCDE .t21	.	.	+INF	16527.6535
BCDE .t22	.	1.0000	+INF	.
ABC .t23	.	.	+INF	.
ABC .t24	.	.	+INF	.
ABC .t25	.	.	+INF	.
BCD .t26	.	.	+INF	9779.3427
BCD .t27	.	1.0000	+INF	.
BCD .t28	.	1.0000	+INF	.
CDE .t29	.	.	+INF	.
CDE .t30	.	.	+INF	.
CDE .t31	.	.	+INF	.
AB .t32	.	.	+INF	.
BC .t33	.	.	+INF	.
CD .t34	.	.	+INF	16571.2517
DE .t35	.	.	+INF	37672.7621

---- EQU logic15

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	+INF	.
ABCD	.	.	+INF	.
BCDE	.	.	+INF	.
ABC	.	.	+INF	0.7357
BCD	.	.	+INF	.
CDE	.	.	+INF	751.1222
AB	.	.	+INF	0.4323
BC	.	.	+INF	0.4224
CD	.	.	+INF	.
DE	.	.	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU objfun	.	.	.	1.0000
---- EQU objfun2	.	.	.	EPS

---- EQU eq1

	LOWER	LEVEL	UPPER	MARGINAL
A.ABCDE	0.6000	0.6000	0.6000	69.2617
B.ABCDE	0.4000	0.4000	0.4000	73.4230
C.ABCDE	0.2000	0.2000	0.2000	216.3499
D.ABCDE	0.4000	0.4000	0.4000	262.6129
E.ABCDE	0.4000	0.4000	0.4000	61.7671

---- EQU eq1b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	25.8685

---- EQU eq2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	-INF	2.0000	2.0000	.
ABCDE.B	-INF	2.0000	2.0000	-79.0939
ABCDE.C	-INF	2.0000	2.0000	-227.2964
ABCDE.D	-INF	2.0000	2.0000	-287.8496
ABCDE.E	-INF	2.0000	2.0000	-18.4642
ABCD .A	-INF	2.0000	2.0000	.
ABCD .B	-INF	2.0000	2.0000	-43.3830
ABCD .C	-INF	2.0000	2.0000	-117.3595
ABCD .D	-INF	2.0000	2.0000	-34.5256
ABCD .E	-INF	2.0000	2.0000	.
BCDE .A	-INF	2.0000	2.0000	.
BCDE .B	-INF	2.0000	2.0000	.
BCDE .C	-INF	2.0000	2.0000	.
BCDE .D	-INF	2.0000	2.0000	-255.6577
BCDE .E	-INF	2.0000	2.0000	.
ABC .A	-INF	-1.25767E-17	2.0000	.
ABC .B	-INF	.	2.0000	.
ABC .C	-INF	.	2.0000	.
ABC .D	-INF	.	2.0000	.
ABC .E	-INF	.	2.0000	.
BCD .A	-INF	2.0000	2.0000	.
BCD .B	-INF	2.0000	2.0000	.
BCD .C	-INF	2.0000	2.0000	-117.3595
BCD .D	-INF	2.0000	2.0000	-34.5256
BCD .E	-INF	2.0000	2.0000	.
CDE .A	-INF	.	2.0000	.
CDE .B	-INF	.	2.0000	.
CDE .C	-INF	.	2.0000	.
CDE .D	-INF	.	2.0000	.
CDE .E	-INF	.	2.0000	.
AB .A	-INF	.	2.0000	.
AB .B	-INF	.	2.0000	.
AB .C	-INF	.	2.0000	.
AB .D	-INF	.	2.0000	.
AB .E	-INF	.	2.0000	.
BC .A	-INF	.	2.0000	.
BC .B	-INF	.	2.0000	.
BC .C	-INF	.	2.0000	.
BC .D	-INF	.	2.0000	.
BC .E	-INF	.	2.0000	.
CD .A	-INF	2.0000	2.0000	.
CD .B	-INF	2.0000	2.0000	.
CD .C	-INF	2.0000	2.0000	.
CD .D	-INF	2.0000	2.0000	-29.8887
CD .E	-INF	2.0000	2.0000	.
DE .A	-INF	2.0000	2.0000	.
DE .B	-INF	2.0000	2.0000	.
DE .C	-INF	2.0000	2.0000	.
DE .D	-INF	2.0000	2.0000	.
DE .E	-INF	2.0000	2.0000	.

---- EQU eq2b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	-2.0000	-2.0000	+INF	.
ABCDE.B	-2.0000	-2.0000	+INF	.
ABCDE.C	-2.0000	-2.0000	+INF	.
ABCDE.D	-2.0000	-2.0000	+INF	.

ABCDE.E	-2.0000	-2.0000	+INF	.
ABCD .A	-2.0000	-2.0000	+INF	.
ABCD .B	-2.0000	-2.0000	+INF	.
ABCD .C	-2.0000	-2.0000	+INF	.
ABCD .D	-2.0000	-2.0000	+INF	.
ABCD .E	-2.0000	-2.0000	+INF	.
BCDE .A	-2.0000	-2.0000	+INF	4.6719
BCDE .B	-2.0000	-2.0000	+INF	5.9039
BCDE .C	-2.0000	-2.0000	+INF	.
BCDE .D	-2.0000	-2.0000	+INF	.
BCDE .E	-2.0000	-2.0000	+INF	.
ABC .A	-2.0000	-1.25767E-17	+INF	.
ABC .B	-2.0000	.	+INF	.
ABC .C	-2.0000	.	+INF	.
ABC .D	-2.0000	.	+INF	.
ABC .E	-2.0000	.	+INF	.
BCD .A	-2.0000	-2.0000	+INF	.
BCD .B	-2.0000	-2.0000	+INF	.
BCD .C	-2.0000	-2.0000	+INF	.
BCD .D	-2.0000	-2.0000	+INF	.
BCD .E	-2.0000	-2.0000	+INF	.
CDE .A	-2.0000	.	+INF	.
CDE .B	-2.0000	.	+INF	.
CDE .C	-2.0000	.	+INF	.
CDE .D	-2.0000	.	+INF	.
CDE .E	-2.0000	.	+INF	.
AB .A	-2.0000	.	+INF	.
AB .B	-2.0000	.	+INF	.
AB .C	-2.0000	.	+INF	.
AB .D	-2.0000	.	+INF	.
AB .E	-2.0000	.	+INF	.
BC .A	-2.0000	.	+INF	.
BC .B	-2.0000	.	+INF	.
BC .C	-2.0000	.	+INF	.
BC .D	-2.0000	.	+INF	.
BC .E	-2.0000	.	+INF	.
CD .A	-2.0000	-2.0000	+INF	14.6661
CD .B	-2.0000	-2.0000	+INF	16.4207
CD .C	-2.0000	-2.0000	+INF	34.7762
CD .D	-2.0000	-2.0000	+INF	.
CD .E	-2.0000	-2.0000	+INF	EPS
DE .A	-2.0000	-2.0000	+INF	418.4224
DE .B	-2.0000	-2.0000	+INF	406.4110
DE .C	-2.0000	-2.0000	+INF	394.5484
DE .D	-2.0000	-2.0000	+INF	388.3442
DE .E	-2.0000	-2.0000	+INF	381.0479

---- EQU eq3

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	EPS
ABCD	.	.	.	EPS
BCDE	.	.	.	EPS
ABC	.	.	.	EPS
BCD	.	.	.	EPS
CDE	.	.	.	EPS
AB	.	.	.	EPS
BC	.	.	.	EPS
CD	.	.	.	EPS
DE	.	.	.	EPS

---- EQU eq4

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	-2.7447
ABCD	.	.	.	EPS
BCDE	.	.	.	EPS
ABC	.	.	.	EPS
BCD	.	.	.	EPS
CDE	.	.	.	EPS
AB	.	.	.	-1.9710
BC	.	.	.	-2.8963
CD	.	.	.	-2.0123
DE	.	.	.	-15.0717

---- EQU eq5

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	-75.4037
ABCD	.	.	.	EPS
BCDE	.	.	.	EPS
ABC	.	.	.	EPS
BCD	.	.	.	-5.4734
CDE	.	.	.	-67.8600
AB	.	.	.	EPS
BC	.	.	.	EPS
CD	.	.	.	-9.5983
DE	.	.	.	-571.1467

---- EQU eq6a

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-INF	10.0000	10.0000	.
ABCD	-INF	10.0000	10.0000	EPS
BCDE	-INF	10.0000	10.0000	.
ABC	-INF	.	10.0000	.
BCD	-INF	10.0000	10.0000	.
CDE	-INF	.	10.0000	.
AB	-INF	.	10.0000	.
BC	-INF	-1.11022E-16	10.0000	.
CD	-INF	10.0000	10.0000	-5.4734
DE	-INF	10.0000	10.0000	.

---- EQU eq6b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-10.0000	-10.0000	+INF	EPS
ABCD	-10.0000	-10.0000	+INF	.
BCDE	-10.0000	-10.0000	+INF	EPS
ABC	-10.0000	.	+INF	.
BCD	-10.0000	-10.0000	+INF	EPS
CDE	-10.0000	.	+INF	.
AB	-10.0000	.	+INF	.
BC	-10.0000	-1.11022E-16	+INF	.
CD	-10.0000	-10.0000	+INF	.
DE	-10.0000	-10.0000	+INF	5.4734

---- EQU eq7a

	LOWER	LEVEL	UPPER	MARGINAL

ABCDE	-INF	10.0000	10.0000	EPS
ABCD	-INF	10.0000	10.0000	.
BCDE	-INF	10.0000	10.0000	.
ABC	-INF	.	10.0000	.
BCD	-INF	10.0000	10.0000	.
CDE	-INF	.	10.0000	.
AB	-INF	.	10.0000	.
BC	-INF	.	10.0000	.
CD	-INF	10.0000	10.0000	.
DE	-INF	10.0000	10.0000	EPS

---- EQU eq7b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-10.0000	-10.0000	+INF	.
ABCD	-10.0000	-10.0000	+INF	.
BCDE	-10.0000	-10.0000	+INF	EPS
ABC	-10.0000	.	+INF	.
BCD	-10.0000	-10.0000	+INF	5.4734
CDE	-10.0000	.	+INF	.
AB	-10.0000	.	+INF	.
BC	-10.0000	.	+INF	.
CD	-10.0000	-10.0000	+INF	.
DE	-10.0000	-10.0000	+INF	.

---- EQU eq8

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.A	.	.	.	27.7818
ABCD.B	.	.	.	22.2076
ABCD.C	.	.	.	117.3193
ABCD.D	.	.	.	34.5006
ABCD.E	.	.	.	-0.0172
BCDE.A	.	.	.	10.9424
BCDE.B	.	.	.	84.9666
BCDE.C	.	.	.	228.1621
BCDE.D	.	.	.	286.0967
BCDE.E	.	.	.	13.6317
ABC .A	.	.	.	EPS
ABC .B	.	.	.	EPS
ABC .C	.	.	.	EPS
ABC .D	.	.	.	EPS
ABC .E	.	.	.	EPS
BCD .A	.	.	.	EPS
BCD .B	.	.	.	43.3830
BCD .C	.	.	.	117.3595
BCD .D	.	.	.	34.5256
BCD .E	.	.	.	EPS
CDE .A	.	.	.	EPS
CDE .B	.	.	.	EPS
CDE .C	.	.	.	EPS
CDE .D	.	.	.	EPS
CDE .E	.	.	.	EPS
AB .A	.	.	.	EPS
AB .B	.	.	.	EPS
AB .C	.	.	.	EPS
AB .D	.	.	.	EPS
AB .E	.	.	.	EPS
BC .A	.	.	.	EPS
BC .B	.	.	.	EPS
BC .C	.	.	.	EPS

BC	.D	.	.	EPS
BC	.E	.	.	EPS
CD	.A	.	.	15.8271
CD	.B	.	.	24.6951
CD	.C	.	.	98.9094
CD	.D	.	.	29.8887
CD	.E	.	.	EPS
DE	.A	.	.	12.6963
DE	.B	.	.	8.3577
DE	.C	.	.	67.1014
DE	.D	.	.	289.4379
DE	.E	.	.	-25.7303

---- EQU eq10

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	-12.6593	.	.
BCDE	-INF	-7.3407	.	.
ABC	-INF	.	.	.
BCD	-INF	.	.	-5.7231
CDE	-INF	.	.	-30.8266
AB	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	.	.	-17.8926
DE	-INF	-8.7333	.	.

---- EQU eq11

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	7.3407	+INF	.
BCDE	.	12.6593	+INF	.
ABC	.	.	+INF	0.9354
BCD	.	.	+INF	.
CDE	.	.	+INF	.
AB	.	.	+INF	0.9354
BC	.	.	+INF	1.0090
CD	.	.	+INF	.
DE	.	11.2667	+INF	.

---- EQU eq12

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	-12.6593	.	.
BCDE	-INF	-7.3407	.	.
ABC	-INF	.	.	.
BCD	-INF	.	.	.
CDE	-INF	.	.	.
AB	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	.	.	.
DE	-INF	-8.7333	.	.

---- EQU eq13

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	7.3407	+INF	.
BCDE	.	12.6593	+INF	.
ABC	.	.	+INF	EPS
BCD	.	.	+INF	EPS

CDE	.	.	+INF	EPS
AB	.	.	+INF	EPS
BC	.	.	+INF	EPS
CD	.	.	+INF	5.4734
DE	.	11.2667	+INF	.

---- EQU eq14

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-INF	.	10.0000	.
ABCD	-INF	10.0000	10.0000	.
BCDE	-INF	10.0000	10.0000	.
ABC	-INF	-1.1721	10.0000	.
BCD	-INF	-0.0946	10.0000	.
CDE	-INF	1.2667	10.0000	.
AB	-INF	-1.1721	10.0000	.
BC	-INF	-1.1482	10.0000	.
CD	-INF	1.0537	10.0000	.
DE	-INF	10.0000	10.0000	.

---- EQU eq15

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-10.0000	.	+INF	.
ABCD	-10.0000	-10.0000	+INF	5.7668
BCDE	-10.0000	-10.0000	+INF	18.8590
ABC	-10.0000	-1.1721	+INF	.
BCD	-10.0000	-0.0946	+INF	.
CDE	-10.0000	1.2667	+INF	.
AB	-10.0000	-1.1721	+INF	.
BC	-10.0000	-1.1482	+INF	.
CD	-10.0000	1.0537	+INF	.
DE	-10.0000	-10.0000	+INF	.

---- EQU eq16

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	-11.4872	.	.
ABC	-INF	.	.	.
BCD	-INF	-10.1184	.	.
AB	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	-8.6158	.	.

---- EQU eq17

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	8.5128	+INF	.
ABC	.	.	+INF	.
BCD	.	9.8816	+INF	.
AB	.	.	+INF	.
BC	.	.	+INF	.
CD	.	11.3842	+INF	.

---- EQU eq18

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	-INF	-11.1209	.	.

ABC	-INF	.	.	.
BCD	-INF	-10.0600	.	.
AB	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	-8.8158	.	.

---- EQU eq19

	LOWER	LEVEL	UPPER	MARGINAL
ABCD	.	8.8791	+INF	.
ABC	.	.	+INF	.
BCD	.	9.9400	+INF	.
AB	.	.	+INF	.
BC	.	.	+INF	.
CD	.	11.1842	+INF	.

---- EQU eq20

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	-INF	-11.8510	.	.
BCD	-INF	-10.0600	.	.
CDE	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	-8.8158	.	.
DE	-INF	-9.0042	.	.

---- EQU eq21

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	.	8.1490	+INF	.
BCD	.	9.9400	+INF	.
CDE	.	.	+INF	.
BC	.	.	+INF	.
CD	.	11.1842	+INF	.
DE	.	10.9958	+INF	.

---- EQU eq22

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	-INF	-11.3926	.	.
BCD	-INF	-10.1184	.	.
CDE	-INF	.	.	.
BC	-INF	.	.	.
CD	-INF	-8.6158	.	.
DE	-INF	-8.8288	.	.

---- EQU eq23

	LOWER	LEVEL	UPPER	MARGINAL
BCDE	.	8.6074	+INF	.
BCD	.	9.8816	+INF	.
CDE	.	.	+INF	.
BC	.	.	+INF	.
CD	.	11.3842	+INF	.
DE	.	11.1712	+INF	.

---- EQU eq24

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.A	-INF	-2.0000	.	.
ABCD.B	-INF	-2.0018	.	.
ABCD.C	-INF	-2.1970	.	.
ABCD.D	-INF	-2.1674	.	.
ABCD.E	-INF	-2.0000	.	.
ABC .A	-INF	.	.	.
ABC .B	-INF	.	.	.
ABC .C	-INF	.	.	.
ABC .D	-INF	.	.	.
ABC .E	-INF	.	.	.
BCD .A	-INF	-2.0000	.	.
BCD .B	-INF	-1.9982	.	.
BCD .C	-INF	-2.0030	.	.
BCD .D	-INF	-2.0572	.	.
BCD .E	-INF	-2.0000	.	.
AB .A	-INF	.	.	.
AB .B	-INF	.	.	.
AB .C	-INF	.	.	.
AB .D	-INF	.	.	.
AB .E	-INF	.	.	.
BC .A	-INF	.	.	-0.2112
BC .B	-INF	.	.	.
BC .C	-INF	.	.	.
BC .D	-INF	.	.	.
BC .E	-INF	.	.	.
CD .A	-INF	-2.0000	.	.
CD .B	-INF	-2.0000	.	.
CD .C	-INF	-1.8000	.	.
CD .D	-INF	-2.0000	.	.
CD .E	-INF	-2.0000	.	.

---- EQU eq25

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.A	.	2.0000	+INF	.
ABCD.B	.	1.9982	+INF	.
ABCD.C	.	1.8030	+INF	.
ABCD.D	.	1.8326	+INF	.
ABCD.E	.	2.0000	+INF	.
ABC .A	.	.	+INF	.
ABC .B	.	.	+INF	.
ABC .C	.	.	+INF	.
ABC .D	.	.	+INF	.
ABC .E	.	.	+INF	.
BCD .A	.	2.0000	+INF	.
BCD .B	.	2.0018	+INF	.
BCD .C	.	1.9970	+INF	.
BCD .D	.	1.9428	+INF	.
BCD .E	.	2.0000	+INF	.
AB .A	.	.	+INF	.
AB .B	.	.	+INF	EPS
AB .C	.	.	+INF	EPS
AB .D	.	.	+INF	0.2162
AB .E	.	.	+INF	.
BC .A	.	.	+INF	.
BC .B	.	.	+INF	EPS
BC .C	.	.	+INF	.
BC .D	.	.	+INF	.
BC .E	.	.	+INF	.
CD .A	.	2.0000	+INF	.

CD .B	.	2.0000	+INF	.
CD .C	.	2.2000	+INF	.
CD .D	.	2.0000	+INF	.
CD .E	.	2.0000	+INF	.

---- EQU eq26

	LOWER	LEVEL	UPPER	MARGINAL
BCDE.A	-INF	-2.0000	.	.
BCDE.B	-INF	-2.3982	.	.
BCDE.C	-INF	-2.0030	.	.
BCDE.D	-INF	-2.0572	.	.
BCDE.E	-INF	-2.0000	.	.
BCD .A	-INF	-2.0000	.	.
BCD .B	-INF	-2.0018	.	.
BCD .C	-INF	-1.9970	.	.
BCD .D	-INF	-1.9428	.	.
BCD .E	-INF	-2.0000	.	.
CDE .A	-INF	.	.	.
CDE .B	-INF	.	.	.
CDE .C	-INF	.	.	.
CDE .D	-INF	.	.	.
CDE .E	-INF	.	.	-24.9269
BC .A	-INF	.	.	EPS
BC .B	-INF	.	.	EPS
BC .C	-INF	.	.	EPS
BC .D	-INF	.	.	.
BC .E	-INF	.	.	.
CD .A	-INF	-2.0000	.	.
CD .B	-INF	-2.0000	.	.
CD .C	-INF	-2.2000	.	.
CD .D	-INF	-2.0000	.	.
CD .E	-INF	-2.0000	.	.
DE .A	-INF	-2.0000	.	.
DE .B	-INF	-2.0000	.	.
DE .C	-INF	-2.0000	.	.
DE .D	-INF	-2.1754	.	.
DE .E	-INF	-2.0000	.	.

---- EQU eq27

	LOWER	LEVEL	UPPER	MARGINAL
BCDE.A	.	2.0000	+INF	.
BCDE.B	.	1.6018	+INF	.
BCDE.C	.	1.9970	+INF	.
BCDE.D	.	1.9428	+INF	.
BCDE.E	.	2.0000	+INF	.
BCD .A	.	2.0000	+INF	.
BCD .B	.	1.9982	+INF	.
BCD .C	.	2.0030	+INF	.
BCD .D	.	2.0572	+INF	.
BCD .E	.	2.0000	+INF	.
CDE .A	.	.	+INF	.
CDE .B	.	.	+INF	.
CDE .C	.	.	+INF	63.0284
CDE .D	.	.	+INF	287.6058
CDE .E	.	.	+INF	.
BC .A	.	.	+INF	.
BC .B	.	.	+INF	.
BC .C	.	.	+INF	.
BC .D	.	.	+INF	.

```
BC  .E          .              .             +INF             .
CD  .A          .            2.0000          +INF             .
CD  .B          .            2.0000          +INF             .
CD  .C          .            1.8000          +INF             .
CD  .D          .            2.0000          +INF             .
CD  .E          .            2.0000          +INF             .
DE  .A          .            2.0000          +INF             .
DE  .B          .            2.0000          +INF             .
DE  .C          .            2.0000          +INF             .
DE  .D          .            1.8246          +INF             .
DE  .E          .            2.0000          +INF             .

                           LOWER          LEVEL          UPPER         MARGINAL

---- EQU eq28                0.6000         0.6000         0.6000         0.1437
---- EQU eq29                0.4000         0.4000         0.4000         EPS
---- EQU eq30                0.2000         0.2000         0.2000         EPS
---- EQU eq31                0.4000         0.4000         0.4000         9.5983
---- EQU eq32                0.4000         0.4000         0.4000       381.0479
---- EQU eq33               -INF          -10.7482         0.4000           .
---- EQU eq34                0.4000         9.2518        +INF              .
---- EQU eq35               -INF          -11.1842         0.2000           .
---- EQU eq36                0.2000         8.8158        +INF              .
---- EQU eq37               -INF            0.4000         0.4000           .
---- EQU eq38                0.4000         0.4000        +INF            5.4734

---- EQU eq39

            LOWER          LEVEL          UPPER         MARGINAL

ABCD        -INF           -8.8279          .               .
ABC         -INF             .              .            -0.0736
AB          -INF             .              .               .

---- EQU eq40

            LOWER          LEVEL          UPPER         MARGINAL

ABCD        -INF           -8.4617          .               .
ABC         -INF             .              .               .
AB          -INF             .              .             EPS

---- EQU eq41

            LOWER          LEVEL          UPPER         MARGINAL

BCDE        -INF           -8.7333          .               .
CDE         -INF             .              .               .
DE          -INF           -7.5622          .               .

---- EQU eq42

            LOWER          LEVEL          UPPER         MARGINAL

BCDE        -INF           -9.1917          .               .
CDE         -INF             .              .               .
DE          -INF           -7.7376          .               .

---- EQU eq43

                   LOWER          LEVEL          UPPER         MARGINAL

ABCDE.t1 .A        -INF             .            2.0000          .
```

ABCDE.t2 .A	-INF	.	2.0000	.
ABCDE.t3 .A	-INF	.	2.0000	.
ABCDE.t3 .B	-INF	0.3982	2.0000	.
ABCDE.t4 .A	-INF	.	2.0000	.
ABCDE.t5 .A	-INF	.	2.0000	.
ABCDE.t5 .B	-INF	0.3982	2.0000	.
ABCDE.t6 .A	-INF	.	2.0000	.
ABCDE.t6 .B	-INF	0.3982	2.0000	.
ABCDE.t6 .C	-INF	0.0030	2.0000	.
ABCDE.t7 .A	-INF	2.0000	2.0000	-73.8764
ABCDE.t8 .A	-INF	.	2.0000	.
ABCDE.t8 .B	-INF	0.3982	2.0000	.
ABCDE.t9 .A	-INF	.	2.0000	.
ABCDE.t9 .B	-INF	0.3982	2.0000	.
ABCDE.t9 .C	-INF	0.0030	2.0000	.
ABCDE.t10.A	-INF	.	2.0000	.
ABCDE.t10.B	-INF	0.3982	2.0000	.
ABCDE.t10.C	-INF	0.0030	2.0000	.
ABCDE.t10.D	-INF	0.2326	2.0000	.
ABCD .t11.A	-INF	2.0000	2.0000	-27.6965
ABCD .t12.A	-INF	.	2.0000	.
ABCD .t13.A	-INF	.	2.0000	.
ABCD .t13.B	-INF	0.0018	2.0000	.
ABCD .t14.A	-INF	.	2.0000	.
ABCD .t15.A	-INF	.	2.0000	.
ABCD .t15.B	-INF	0.0018	2.0000	.
ABCD .t16.A	-INF	.	2.0000	.
ABCD .t16.B	-INF	0.0018	2.0000	.
ABCD .t16.C	-INF	0.1970	2.0000	.
BCDE .t17.A	-INF	.	2.0000	.
BCDE .t17.B	-INF	.	2.0000	.
BCDE .t18.A	-INF	.	2.0000	.
BCDE .t18.B	-INF	.	2.0000	.
BCDE .t19.A	-INF	.	2.0000	.
BCDE .t19.B	-INF	.	2.0000	.
BCDE .t19.C	-INF	.	2.0000	.
BCDE .t20.A	-INF	.	2.0000	.
BCDE .t20.B	-INF	.	2.0000	.
BCDE .t21.A	-INF	2.0000	2.0000	-50.2626
BCDE .t21.B	-INF	2.0000	2.0000	-108.9072
BCDE .t21.C	-INF	2.0000	2.0000	-2027.5461
BCDE .t22.A	-INF	.	2.0000	.
BCDE .t22.B	-INF	.	2.0000	.
BCDE .t22.C	-INF	.	2.0000	.
BCDE .t22.D	-INF	0.1754	2.0000	.
ABC .t23.A	-INF	.	2.0000	.
ABC .t24.A	-INF	.	2.0000	.
ABC .t25.A	-INF	.	2.0000	.
ABC .t25.B	-INF	.	2.0000	.
BCD .t26.A	-INF	2.0000	2.0000	.
BCD .t26.B	-INF	2.0000	2.0000	-43.3830
BCD .t27.A	-INF	.	2.0000	.
BCD .t27.B	-INF	.	2.0000	.
BCD .t28.A	-INF	.	2.0000	.
BCD .t28.B	-INF	.	2.0000	.
BCD .t28.C	-INF	0.2000	2.0000	.
CDE .t29.A	-INF	.	2.0000	.
CDE .t29.B	-INF	.	2.0000	.
CDE .t29.C	-INF	1.058360E-22	2.0000	.
CDE .t30.A	-INF	.	2.0000	.
CDE .t30.B	-INF	.	2.0000	.
CDE .t30.C	-INF	1.058360E-22	2.0000	.
CDE .t31.A	-INF	.	2.0000	.

CDE .t31.B	-INF	.	2.0000	.
CDE .t31.C	-INF	1.058360E-22	2.0000	.
CDE .t31.D	-INF	0.1754	2.0000	.
AB .t32.A	-INF	.	2.0000	.
BC .t33.A	-INF	1.257675E-17	2.0000	.
BC .t33.B	-INF	.	2.0000	.
CD .t34.A	-INF	2.0000	2.0000	-30.4932
CD .t34.B	-INF	2.0000	2.0000	-41.1158
CD .t34.C	-INF	2.0000	2.0000	-133.6855
DE .t35.A	-INF	2.0000	2.0000	-482.7758
DE .t35.B	-INF	2.0000	2.0000	-479.8052
DE .t35.C	-INF	2.0000	2.0000	-604.7014
DE .t35.D	-INF	2.0000	2.0000	-1207.8899

---- EQU eq44

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1 .A	-2.0000	.	+INF	.
ABCDE.t2 .A	-2.0000	.	+INF	.
ABCDE.t3 .A	-2.0000	.	+INF	.
ABCDE.t3 .B	-2.0000	0.3982	+INF	.
ABCDE.t4 .A	-2.0000	.	+INF	.
ABCDE.t5 .A	-2.0000	.	+INF	.
ABCDE.t5 .B	-2.0000	0.3982	+INF	.
ABCDE.t6 .A	-2.0000	.	+INF	.
ABCDE.t6 .B	-2.0000	0.3982	+INF	.
ABCDE.t6 .C	-2.0000	0.0030	+INF	.
ABCDE.t7 .A	-2.0000	-2.0000	+INF	.
ABCDE.t8 .A	-2.0000	.	+INF	.
ABCDE.t8 .B	-2.0000	0.3982	+INF	.
ABCDE.t9 .A	-2.0000	.	+INF	.
ABCDE.t9 .B	-2.0000	0.3982	+INF	.
ABCDE.t9 .C	-2.0000	0.0030	+INF	.
ABCDE.t10.A	-2.0000	.	+INF	.
ABCDE.t10.B	-2.0000	0.3982	+INF	.
ABCDE.t10.C	-2.0000	0.0030	+INF	.
ABCDE.t10.D	-2.0000	0.2326	+INF	.
ABCD .t11.A	-2.0000	-2.0000	+INF	.
ABCD .t12.A	-2.0000	.	+INF	.
ABCD .t13.A	-2.0000	.	+INF	.
ABCD .t13.B	-2.0000	0.0018	+INF	.
ABCD .t14.A	-2.0000	.	+INF	.
ABCD .t15.A	-2.0000	.	+INF	.
ABCD .t15.B	-2.0000	0.0018	+INF	.
ABCD .t16.A	-2.0000	.	+INF	.
ABCD .t16.B	-2.0000	0.0018	+INF	.
ABCD .t16.C	-2.0000	0.1970	+INF	.
BCDE .t17.A	-2.0000	.	+INF	.
BCDE .t17.B	-2.0000	.	+INF	.
BCDE .t18.A	-2.0000	.	+INF	.
BCDE .t18.B	-2.0000	.	+INF	.
BCDE .t19.A	-2.0000	.	+INF	.
BCDE .t19.B	-2.0000	.	+INF	.
BCDE .t19.C	-2.0000	.	+INF	.
BCDE .t20.A	-2.0000	.	+INF	.
BCDE .t20.B	-2.0000	.	+INF	.
BCDE .t21.A	-2.0000	-2.0000	+INF	.
BCDE .t21.B	-2.0000	-2.0000	+INF	.
BCDE .t21.C	-2.0000	-2.0000	+INF	.
BCDE .t22.A	-2.0000	.	+INF	.
BCDE .t22.B	-2.0000	.	+INF	.
BCDE .t22.C	-2.0000	.	+INF	.

BCDE .t22.D	-2.0000	0.1754	+INF	.
ABC .t23.A	-2.0000	.	+INF	.
ABC .t24.A	-2.0000	.	+INF	.
ABC .t25.A	-2.0000	.	+INF	.
ABC .t25.B	-2.0000	.	+INF	.
BCD .t26.A	-2.0000	-2.0000	+INF	.
BCD .t26.B	-2.0000	-2.0000	+INF	.
BCD .t27.A	-2.0000	.	+INF	.
BCD .t27.B	-2.0000	.	+INF	.
BCD .t28.A	-2.0000	.	+INF	.
BCD .t28.B	-2.0000	.	+INF	.
BCD .t28.C	-2.0000	0.2000	+INF	.
CDE .t29.A	-2.0000	.	+INF	.
CDE .t29.B	-2.0000	.	+INF	.
CDE .t29.C	-2.0000	1.058360E-22	+INF	.
CDE .t30.A	-2.0000	.	+INF	.
CDE .t30.B	-2.0000	.	+INF	.
CDE .t30.C	-2.0000	1.058360E-22	+INF	.
CDE .t31.A	-2.0000	.	+INF	.
CDE .t31.B	-2.0000	.	+INF	.
CDE .t31.C	-2.0000	1.058360E-22	+INF	.
CDE .t31.D	-2.0000	0.1754	+INF	.
AB .t32.A	-2.0000	.	+INF	.
BC .t33.A	-2.0000	1.257675E-17	+INF	.
BC .t33.B	-2.0000	.	+INF	.
CD .t34.A	-2.0000	-2.0000	+INF	.
CD .t34.B	-2.0000	-2.0000	+INF	.
CD .t34.C	-2.0000	-2.0000	+INF	.
DE .t35.A	-2.0000	-2.0000	+INF	.
DE .t35.B	-2.0000	-2.0000	+INF	.
DE .t35.C	-2.0000	-2.0000	+INF	.
DE .t35.D	-2.0000	-2.0000	+INF	.

---- EQU eq45

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1 .B	-INF	0.0018	2.0000	.
ABCDE.t1 .C	-INF	0.1970	2.0000	.
ABCDE.t1 .D	-INF	0.1674	2.0000	.
ABCDE.t1 .E	-INF	.	2.0000	.
ABCDE.t2 .C	-INF	0.1970	2.0000	.
ABCDE.t2 .D	-INF	0.1674	2.0000	.
ABCDE.t2 .E	-INF	.	2.0000	.
ABCDE.t3 .C	-INF	0.1970	2.0000	.
ABCDE.t3 .D	-INF	0.1674	2.0000	.
ABCDE.t3 .E	-INF	.	2.0000	.
ABCDE.t4 .D	-INF	0.1674	2.0000	.
ABCDE.t4 .E	-INF	.	2.0000	.
ABCDE.t5 .D	-INF	0.1674	2.0000	.
ABCDE.t5 .E	-INF	.	2.0000	.
ABCDE.t6 .D	-INF	0.1674	2.0000	.
ABCDE.t6 .E	-INF	.	2.0000	.
ABCDE.t7 .E	-INF	2.0000	2.0000	-452.1578
ABCDE.t8 .E	-INF	.	2.0000	.
ABCDE.t9 .E	-INF	.	2.0000	.
ABCDE.t10.E	-INF	.	2.0000	.
ABCD .t11.B	-INF	2.0000	2.0000	-6916.8582
ABCD .t11.C	-INF	2.0000	2.0000	-130.4355
ABCD .t11.D	-INF	2.0000	2.0000	-42.6599
ABCD .t11.E	-INF	2.0000	2.0000	-5.5782
ABCD .t12.C	-INF	.	2.0000	.
ABCD .t12.D	-INF	.	2.0000	.

ABCD .t12.E	-INF	.	2.0000	.
ABCD .t13.C	-INF	.	2.0000	.
ABCD .t13.D	-INF	.	2.0000	.
ABCD .t13.E	-INF	.	2.0000	.
ABCD .t14.D	-INF	.	2.0000	.
ABCD .t14.E	-INF	.	2.0000	.
ABCD .t15.D	-INF	.	2.0000	.
ABCD .t15.E	-INF	.	2.0000	.
ABCD .t16.D	-INF	.	2.0000	.
ABCD .t16.E	-INF	.	2.0000	.
BCDE .t17.C	-INF	0.0030	2.0000	.
BCDE .t17.D	-INF	0.0572	2.0000	.
BCDE .t17.E	-INF	.	2.0000	.
BCDE .t18.D	-INF	0.0572	2.0000	.
BCDE .t18.E	-INF	.	2.0000	.
BCDE .t19.D	-INF	0.0572	2.0000	.
BCDE .t19.E	-INF	.	2.0000	.
BCDE .t20.E	-INF	.	2.0000	.
BCDE .t21.E	-INF	2.0000	2.0000	-202.1654
BCDE .t22.E	-INF	.	2.0000	.
ABC .t23.B	-INF	.	2.0000	.
ABC .t23.C	-INF	.	2.0000	.
ABC .t23.D	-INF	.	2.0000	.
ABC .t23.E	-INF	.	2.0000	.
ABC .t24.C	-INF	.	2.0000	.
ABC .t24.D	-INF	.	2.0000	.
ABC .t24.E	-INF	.	2.0000	.
ABC .t25.C	-INF	.	2.0000	.
ABC .t25.D	-INF	.	2.0000	.
ABC .t25.E	-INF	.	2.0000	.
BCD .t26.C	-INF	2.0000	2.0000	-171.3546
BCD .t26.D	-INF	2.0000	2.0000	-57.3445
BCD .t26.E	-INF	2.0000	2.0000	-13.4224
BCD .t27.D	-INF	.	2.0000	.
BCD .t27.E	-INF	.	2.0000	.
BCD .t28.D	-INF	.	2.0000	.
BCD .t28.E	-INF	.	2.0000	.
CDE .t29.D	-INF	.	2.0000	.
CDE .t29.E	-INF	.	2.0000	.
CDE .t30.E	-INF	.	2.0000	.
CDE .t31.E	-INF	.	2.0000	.
AB .t32.B	-INF	.	2.0000	.
AB .t32.C	-INF	.	2.0000	.
AB .t32.D	-INF	.	2.0000	.
AB .t32.E	-INF	.	2.0000	.
BC .t33.C	-INF	.	2.0000	.
BC .t33.D	-INF	.	2.0000	.
BC .t33.E	-INF	.	2.0000	.
CD .t34.D	-INF	2.0000	2.0000	-170.6901
CD .t34.E	-INF	2.0000	2.0000	-29.5741
DE .t35.E	-INF	2.0000	2.0000	.

---- EQU uw1a

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	-INF	200.0000	200.0000	EPS
ABCDE.r2	-INF	200.0000	200.0000	.
ABCDE.r3	-INF	200.0000	200.0000	.
ABCDE.r4	-INF	200.0000	200.0000	.
ABCD .r1	-INF	200.0000	200.0000	-0.0437
ABCD .r2	-INF	200.0000	200.0000	EPS
ABCD .r3	-INF	200.0000	200.0000	.

BCDE .r2	-INF	200.0000	200.0000	.
BCDE .r3	-INF	200.0000	200.0000	.
BCDE .r4	-INF	200.0000	200.0000	.
ABC .r1	-INF	1.1685	200.0000	.
ABC .r2	-INF	-0.1774	200.0000	.
BCD .r2	-INF	200.0000	200.0000	.
BCD .r3	-INF	200.0000	200.0000	.
CDE .r3	-INF	-27.8060	200.0000	.
CDE .r4	-INF	-45.8143	200.0000	.
AB .r1	-INF	1.1685	200.0000	.
BC .r2	-INF	0.5528	200.0000	.
CD .r3	-INF	200.0000	200.0000	.
DE .r4	-INF	200.0000	200.0000	.

---- EQU uw1b

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	-200.0000	-200.0000	+INF	.
ABCDE.r2	-200.0000	-200.0000	+INF	EPS
ABCDE.r3	-200.0000	-200.0000	+INF	EPS
ABCDE.r4	-200.0000	-200.0000	+INF	3.4444
ABCD .r1	-200.0000	-200.0000	+INF	.
ABCD .r2	-200.0000	-200.0000	+INF	.
ABCD .r3	-200.0000	-200.0000	+INF	EPS
BCDE .r2	-200.0000	-200.0000	+INF	EPS
BCDE .r3	-200.0000	-200.0000	+INF	8.5198
BCDE .r4	-200.0000	-200.0000	+INF	.
ABC .r1	-200.0000	1.1685	+INF	.
ABC .r2	-200.0000	-0.1774	+INF	.
BCD .r2	-200.0000	-200.0000	+INF	.
BCD .r3	-200.0000	-200.0000	+INF	EPS
CDE .r3	-200.0000	-27.8060	+INF	.
CDE .r4	-200.0000	-45.8143	+INF	.
AB .r1	-200.0000	1.1685	+INF	.
BC .r2	-200.0000	0.5528	+INF	.
CD .r3	-200.0000	-200.0000	+INF	.
DE .r4	-200.0000	-200.0000	+INF	38.1405

---- EQU uw2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	-INF	198.7271	200.0000	.
ABCDE.r2	-INF	197.0803	200.0000	.
ABCDE.r3	-INF	198.9863	200.0000	.
ABCDE.r4	-INF	200.0000	200.0000	-34.5317
ABCD .r1	-INF	200.0000	200.0000	-14.1780
ABCD .r2	-INF	199.7574	200.0000	.
ABCD .r3	-INF	199.6618	200.0000	.
BCDE .r2	-INF	199.5614	200.0000	.
BCDE .r3	-INF	200.0000	200.0000	-8.6370
BCDE .r4	-INF	200.0000	200.0000	-24.5844
ABC .r1	-INF	1.1685	200.0000	.
ABC .r2	-INF	-0.1774	200.0000	.
BCD .r2	-INF	200.0000	200.0000	-15.1130
BCD .r3	-INF	199.6077	200.0000	.
CDE .r3	-INF	.	200.0000	.
CDE .r4	-INF	.	200.0000	.
AB .r1	-INF	1.1685	200.0000	.
BC .r2	-INF	0.5528	200.0000	.
CD .r3	-INF	200.0000	200.0000	-13.5008
DE .r4	-INF	200.0000	200.0000	-60.0496

---- EQU uw3

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	-INF	198.7271	200.0000	.
ABCDE.r2	-INF	197.0803	200.0000	.
ABCDE.r3	-INF	198.9863	200.0000	.
ABCDE.r4	-INF	200.0000	200.0000	.
ABCD .r1	-INF	200.0000	200.0000	.
ABCD .r2	-INF	199.7574	200.0000	.
ABCD .r3	-INF	199.6618	200.0000	.
BCDE .r2	-INF	199.5614	200.0000	.
BCDE .r3	-INF	200.0000	200.0000	-0.2454
BCDE .r4	-INF	200.0000	200.0000	-3.2024
ABC .r1	-INF	-4.90610E-17	200.0000	.
ABC .r2	-INF	-2.08509E-17	200.0000	.
BCD .r2	-INF	200.0000	200.0000	-6.6961
BCD .r3	-INF	199.6077	200.0000	.
CDE .r3	-INF	27.8060	200.0000	.
CDE .r4	-INF	45.8143	200.0000	.
AB .r1	-INF	.	200.0000	.
BC .r2	-INF	-2.08509E-17	200.0000	.
CD .r3	-INF	200.0000	200.0000	-3.6380
DE .r4	-INF	200.0000	200.0000	.

---- EQU heat5

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-INF	.	1.0000	.
ABCD	-INF	1.0000	1.0000	.
BCDE	-INF	1.0000	1.0000	.
ABC	-INF	.	1.0000	.
BCD	-INF	.	1.0000	.
CDE	-INF	.	1.0000	.
AB	-INF	.	1.0000	.
BC	-INF	.	1.0000	.
CD	-INF	.	1.0000	.
DE	-INF	1.0000	1.0000	.
A	-INF	1.0000	1.0000	EPS
B	-INF	1.0000	1.0000	.
C	-INF	1.0000	1.0000	.
D	-INF	.	1.0000	.
E	-INF	1.0000	1.0000	EPS

---- EQU heat6

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	EPS
ABCD	.	.	.	EPS
BCDE	.	.	.	EPS
ABC	.	.	.	EPS
BCD	.	.	.	55.7307
CDE	.	.	.	EPS
AB	.	.	.	EPS
BC	.	.	.	EPS
CD	.	.	.	EPS
DE	.	.	.	EPS
A	.	.	.	.
B	.	.	.	EPS
C	.	.	.	EPS

D	.	.	.	53.2338
E	.	.	.	.

---- EQU heat7

	LOWER	LEVEL	UPPER	MARGINAL
ABCD.t7	-1.0000	-1.0000	+INF	31.4627
ABCD.t8	-1.0000	.	+INF	.
ABCD.t9	-1.0000	.	+INF	.
ABCD.t10	-1.0000	.	+INF	.
ABC .t4	-1.0000	.	+INF	.
ABC .t5	-1.0000	.	+INF	.
ABC .t6	-1.0000	.	+INF	.
ABC .t14	-1.0000	.	+INF	.
ABC .t15	-1.0000	.	+INF	.
ABC .t16	-1.0000	.	+INF	.
BCD .t20	-1.0000	.	+INF	.
BCD .t21	-1.0000	-1.0000	+INF	55.7307
BCD .t22	-1.0000	.	+INF	.
AB .t2	-1.0000	.	+INF	.
AB .t3	-1.0000	.	+INF	.
AB .t12	-1.0000	.	+INF	.
AB .t13	-1.0000	.	+INF	.
AB .t24	-1.0000	.	+INF	.
AB .t25	-1.0000	.	+INF	.
BC .t18	-1.0000	.	+INF	.
BC .t19	-1.0000	.	+INF	.
BC .t27	-1.0000	.	+INF	.
BC .t28	-1.0000	.	+INF	.
CD .t30	-1.0000	.	+INF	.
CD .t31	-1.0000	.	+INF	.

---- EQU heat8

	LOWER	LEVEL	UPPER	MARGINAL
A.t1	-1.0000	.	+INF	.
A.t11	-1.0000	-1.0000	+INF	50.6667
A.t23	-1.0000	.	+INF	.
A.t32	-1.0000	.	+INF	.
B.t17	-1.0000	.	+INF	.
B.t26	-1.0000	-1.0000	+INF	76.0000
B.t33	-1.0000	.	+INF	.
C.t29	-1.0000	.	+INF	.
C.t34	-1.0000	-1.0000	+INF	152.0000
D.t35	-1.0000	-1.0000	+INF	53.2338

---- EQU heat9

	LOWER	LEVEL	UPPER	MARGINAL
BCDE.t1	-1.0000	.	+INF	.
BCDE.t2	-1.0000	.	+INF	.
BCDE.t4	-1.0000	.	+INF	.
BCDE.t7	-1.0000	-1.0000	+INF	787.7912
BCD .t11	-1.0000	-1.0000	+INF	55.7307
BCD .t12	-1.0000	.	+INF	.
BCD .t14	-1.0000	.	+INF	.
CDE .t3	-1.0000	.	+INF	.
CDE .t5	-1.0000	.	+INF	.
CDE .t8	-1.0000	.	+INF	.
CDE .t17	-1.0000	.	+INF	.

CDE .t18	-1.0000	.	+INF	.
CDE .t20	-1.0000	.	+INF	.
BC .t23	-1.0000	.	+INF	.
BC .t24	-1.0000	.	+INF	.
CD .t13	-1.0000	.	+INF	.
CD .t15	-1.0000	.	+INF	.
CD .t26	-1.0000	-1.0000	+INF	.
CD .t27	-1.0000	.	+INF	.
DE .t6	-1.0000	.	+INF	.
DE .t9	-1.0000	.	+INF	.
DE .t19	-1.0000	.	+INF	.
DE .t21	-1.0000	-1.0000	+INF	1415.3674
DE .t29	-1.0000	.	+INF	.
DE .t30	-1.0000	.	+INF	.

---- EQU heat10

	LOWER	LEVEL	UPPER	MARGINAL
B.t32	-1.0000	-1.0000	+INF	.
C.t25	-1.0000	-1.0000	+INF	.
C.t33	-1.0000	-1.0000	+INF	.
D.t16	-1.0000	.	+INF	.
D.t28	-1.0000	.	+INF	.
D.t34	-1.0000	-1.0000	+INF	53.2338
E.t10	-1.0000	.	+INF	.
E.t22	-1.0000	.	+INF	.
E.t31	-1.0000	.	+INF	.
E.t35	-1.0000	-1.0000	+INF	2036.0000

---- EQU heat11

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.ABCD	-1000.0000	-1000.0000	+INF	0.0315
ABCD .ABC	-1000.0000	-21.6392	+INF	.
BCDE .BCD	-1000.0000	-19.5432	+INF	.
ABC .AB	-1000.0000	-21.6392	+INF	.
BCD .BC	-1000.0000	-15.2439	+INF	.
CDE .CD	-1000.0000	.	+INF	.
AB .A	-1000.0000	-1000.0000	+INF	0.0507
BC .B	-1000.0000	-1000.0000	+INF	0.0760
CD .C	-1000.0000	-1000.0000	+INF	0.1520
DE .D	-1000.0000	-15.7482	+INF	.

---- EQU heat12

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.ABCD	-INF	1000.0000	1000.0000	.
ABCD .ABC	-INF	-21.6392	1000.0000	.
BCDE .BCD	-INF	-19.5432	1000.0000	.
ABC .AB	-INF	-21.6392	1000.0000	.
BCD .BC	-INF	-15.2439	1000.0000	.
CDE .CD	-INF	.	1000.0000	.
AB .A	-INF	1000.0000	1000.0000	.
BC .B	-INF	1000.0000	1000.0000	.
CD .C	-INF	1000.0000	1000.0000	.
DE .D	-INF	-15.7482	1000.0000	.

---- EQU heat13

	LOWER	LEVEL	UPPER	MARGINAL

ABCDE.BCDE	-1000.0000	-1000.0000	+INF	0.7878
ABCD .BCD	-1000.0000	-15.5127	+INF	.
BCDE .CDE	-1000.0000	-27.5875	+INF	.
ABC .BC	-1000.0000	.	+INF	.
BCD .CD	-1000.0000	-16.2140	+INF	.
CDE .DE	-1000.0000	-1000.0000	+INF	1.4154
AB .B	-1000.0000	.	+INF	.
BC .C	-1000.0000	.	+INF	.
CD .D	-1000.0000	-20.1659	+INF	.
DE .E	-1000.0000	-1000.0000	+INF	2.0360

---- EQU heat14

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.BCDE	-INF	1000.0000	1000.0000	.
ABCD .BCD	-INF	-15.5127	1000.0000	.
BCDE .CDE	-INF	-27.5875	1000.0000	.
ABC .BC	-INF	.	1000.0000	.
BCD .CD	-INF	-16.2140	1000.0000	.
CDE .DE	-INF	1000.0000	1000.0000	.
AB .B	-INF	.	1000.0000	.
BC .C	-INF	.	1000.0000	.
CD .D	-INF	-20.1659	1000.0000	.
DE .E	-INF	1000.0000	1000.0000	.

---- EQU Area1

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1	.	.	.	EPS
ABCDE.t2	.	.	.	EPS
ABCDE.t3	.	.	.	EPS
ABCDE.t4	.	.	.	EPS
ABCDE.t5	.	.	.	EPS
ABCDE.t6	.	.	.	EPS
ABCDE.t7	.	.	.	0.2548
ABCDE.t8	.	.	.	EPS
ABCDE.t9	.	.	.	EPS
ABCDE.t10	.	.	.	EPS
ABCD .t11	.	.	.	0.2548
ABCD .t12	.	.	.	EPS
ABCD .t13	.	.	.	EPS
ABCD .t14	.	.	.	EPS
ABCD .t15	.	.	.	EPS
ABCD .t16	.	.	.	EPS
BCDE .t17	.	.	.	EPS
BCDE .t18	.	.	.	EPS
BCDE .t19	.	.	.	EPS
BCDE .t20	.	.	.	EPS
BCDE .t21	.	.	.	0.2548
BCDE .t22	.	.	.	EPS
ABC .t23	.	.	.	EPS
ABC .t24	.	.	.	EPS
ABC .t25	.	.	.	EPS
BCD .t26	.	.	.	0.2548
BCD .t27	.	.	.	EPS
BCD .t28	.	.	.	EPS
CDE .t29	.	.	.	EPS
CDE .t30	.	.	.	EPS
CDE .t31	.	.	.	EPS
AB .t32	.	.	.	EPS

BC	.t33	.	.	EPS
CD	.t34	.	.	0.2548
DE	.t35	.	.	0.2548

---- EQU Area2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1	-1000.0000	-25.9058	+INF	.
ABCDE.t2	-1000.0000	-5.6091	+INF	.
ABCDE.t3	-1000.0000	-32.4268	+INF	.
ABCDE.t4	-1000.0000	-2.2991	+INF	.
ABCDE.t5	-1000.0000	-19.2782	+INF	.
ABCDE.t6	-1000.0000	-123.3945	+INF	.
ABCDE.t7	-1000.0000	-1000.0000	+INF	0.2548
ABCDE.t8	-1000.0000	-12.1227	+INF	.
ABCDE.t9	-1000.0000	-55.9893	+INF	.
ABCDE.t10	-1000.0000	-136.5951	+INF	.
ABCD .t11	-1000.0000	-1000.0000	+INF	0.2548
ABCD .t12	-1000.0000	8.9460	+INF	.
ABCD .t13	-1000.0000	-2.8742	+INF	.
ABCD .t14	-1000.0000	10.4049	+INF	.
ABCD .t15	-1000.0000	2.9211	+INF	.
ABCD .t16	-1000.0000	-42.9691	+INF	.
BCDE .t17	-1000.0000	11.2232	+INF	.
BCDE .t18	-1000.0000	17.4861	+INF	.
BCDE .t19	-1000.0000	-32.1063	+INF	.
BCDE .t20	-1000.0000	20.8944	+INF	.
BCDE .t21	-1000.0000	-1000.0000	+INF	0.2548
BCDE .t22	-1000.0000	-38.3940	+INF	.
ABC .t23	-1000.0000	-27.5583	+INF	.
ABC .t24	-1000.0000	-18.4592	+INF	.
ABC .t25	-1000.0000	-30.4817	+INF	.
BCD .t26	-1000.0000	-1000.0000	+INF	0.2548
BCD .t27	-1000.0000	5.6773	+INF	.
BCD .t28	-1000.0000	-39.2786	+INF	.
CDE .t29	-1000.0000	-3.5632	+INF	.
CDE .t30	-1000.0000	-2.0522	+INF	.
CDE .t31	-1000.0000	-3.8590	+INF	.
AB .t32	-1000.0000	-27.5583	+INF	.
BC .t33	-1000.0000	-14.4448	+INF	.
CD .t34	-1000.0000	-1000.0000	+INF	0.2548
DE .t35	-1000.0000	-1000.0000	+INF	0.2548

---- EQU Area4

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-1000.0000	-1000.0000	+INF	2.5164
ABCD	-1000.0000	-1000.0000	+INF	4.4822
BCDE	-1000.0000	-1000.0000	+INF	6.8941
ABC	-1000.0000	-3.3216	+INF	.
BCD	-1000.0000	-1000.0000	+INF	4.9957
CDE	-1000.0000	-2.0250	+INF	.
AB	-1000.0000	-3.3216	+INF	.
BC	-1000.0000	-4.3338	+INF	.
CD	-1000.0000	-1000.0000	+INF	12.8339
DE	-1000.0000	-1000.0000	+INF	13.9392

---- EQU Area5

	LOWER	LEVEL	UPPER	MARGINAL

ABCDE	.	.	+INF	4.2216
ABCD	.	.	+INF	7.5195
BCDE	.	.	+INF	11.5657
ABC	.	2.0000	+INF	EPS
BCD	.	.	+INF	8.3809
CDE	.	1.2667	+INF	.
AB	.	2.0000	+INF	EPS
BC	.	2.0000	+INF	EPS
CD	.	1.0537	+INF	.
DE	.	.	+INF	16.4357

---- EQU Area6

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	+INF	.
ABCD	.	.	+INF	.
BCDE	.	.	+INF	.
ABC	.	3.1721	+INF	.
BCD	.	0.0946	+INF	.
CDE	.	.	+INF	EPS
AB	.	3.1721	+INF	.
BC	.	3.1482	+INF	.
CD	.	.	+INF	21.5306
DE	.	.	+INF	6.9490

---- EQU Coste1

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	0.0571	0.0571	0.0571	7.9446
ABCD	0.0571	0.0571	0.0571	19.5583
BCDE	0.0571	0.0571	0.0571	33.0449
ABC	0.0571	0.0571	0.0571	EPS
BCD	0.0571	0.0571	0.0571	22.4817
CDE	0.0571	0.0571	0.0571	EPS
AB	0.0571	0.0571	0.0571	EPS
BC	0.0571	0.0571	0.0571	EPS
CD	0.0571	0.0571	0.0571	63.2631
DE	0.0571	0.0571	0.0571	69.1810

---- EQU Coste2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.t1	-41.3522	6.6205	+INF	.
ABCDE.t2	-48.9348	6.6205	+INF	.
ABCDE.t3	-38.9161	6.6205	+INF	.
ABCDE.t4	-50.1714	6.6205	+INF	.
ABCDE.t5	-43.8282	6.6205	+INF	.
ABCDE.t6	-4.9316	6.6205	+INF	.
ABCDE.t7	-51.0303	-51.0303	+INF	0.3408
ABCDE.t8	-46.5014	6.6205	+INF	.
ABCDE.t9	-30.1134	6.6205	+INF	.
ABCDE.t10	.	6.6205	+INF	.
ABCD .t11	-41.3522	-41.3522	+INF	0.1751
ABCD .t12	-48.9348	16.2986	+INF	.
ABCD .t13	-38.9161	16.2986	+INF	.
ABCD .t14	-50.1714	16.2986	+INF	.
ABCD .t15	-43.8282	16.2986	+INF	.
ABCD .t16	-4.9316	16.2986	+INF	.
BCDE .t17	-38.9161	27.5374	+INF	.
BCDE .t18	-43.8282	27.5374	+INF	.

BCDE	.t19	-4.9316	27.5374	+INF	.
BCDE	.t20	-46.5014	27.5374	+INF	.
BCDE	.t21	-30.1134	-30.1134	+INF	0.1846
BCDE	.t22	.	27.5374	+INF	.
ABC	.t23	-41.3522	.	+INF	.
ABC	.t24	-48.9348	.	+INF	.
ABC	.t25	-38.9161	.	+INF	.
BCD	.t26	-38.9161	-38.9161	+INF	0.1727
BCD	.t27	-43.8282	18.7347	+INF	.
BCD	.t28	-4.9316	18.7347	+INF	.
CDE	.t29	-4.9316	.	+INF	.
CDE	.t30	-30.1134	.	+INF	.
CDE	.t31	.	.	+INF	.
AB	.t32	-41.3522	.	+INF	.
BC	.t33	-38.9161	.	+INF	.
CD	.t34	-4.9316	-4.9316	+INF	0.3140
DE	.t35	.	.	+INF	0.3140

	LOWER	LEVEL	UPPER	MARGINAL
---- EQU Coste3	.	.	.	1.0000

---- EQU Coste4

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	-14.4693	-14.4693	+INF	4.2200
ABCD	-14.4693	-14.4693	+INF	4.2200
BCDE	-14.4693	-14.4693	+INF	4.2200
ABC	-14.4693	.	+INF	.
BCD	-14.4693	-14.4693	+INF	4.2200
CDE	-14.4693	.	+INF	.
AB	-14.4693	.	+INF	.
BC	-14.4693	.	+INF	.
CD	-14.4693	-14.4693	+INF	4.2200
DE	-14.4693	-14.4693	+INF	4.2200

---- EQU Coste5

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	1.0000
ABCD	.	.	.	1.0000
BCDE	.	.	.	1.0000
ABC	.	.	.	1.0000
BCD	.	.	.	1.0000
CDE	.	.	.	1.0000
AB	.	.	.	1.0000
BC	.	.	.	1.0000
CD	.	.	.	1.0000
DE	.	.	.	1.0000

---- EQU logicaux

	LOWER	LEVEL	UPPER	MARGINAL
A	.	.	.	EPS
B	.	.	.	EPS
C	.	.	.	EPS
D	.	.	.	EPS
E	.	.	.	EPS

---- EQU logicaux2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	EPS
ABCD	.	.	.	90.6302
BCDE	.	.	.	977.8812
ABC	.	.	.	EPS
BCD	.	.	.	EPS
CDE	.	.	.	EPS
AB	.	.	.	EPS
BC	.	.	.	EPS
CD	.	.	.	-232.1595
DE	.	.	.	1416.8674

---- VAR y task t exists

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	.	.	EPS
t2	.	.	.	-7.8541
t3	.	.	.	-314.6200
t4	.	.	.	-7.8541
t5	.	.	.	-314.6200
t6	.	.	.	-7.8541
t7	1.0000	1.0000	1.0000	13546.0951
t8	.	.	.	-306.7659
t9	.	.	.	EPS
t10	.	.	.	EPS
t11	1.0000	1.0000	1.0000	22398.1270
t12	.	.	.	-7.8541
t13	.	.	.	-7.8541
t14	.	.	.	-7.8541
t15	.	.	.	-7.8541
t16	.	.	.	-7.8541
t17	.	.	.	-306.7659
t18	.	.	.	-315.3556
t19	.	.	.	-8.5898
t20	.	.	.	-306.7659
t21	1.0000	1.0000	1.0000	23041.9621
t22	.	.	.	EPS
t23	.	.	.	-9.3254
t24	.	.	.	-17.1795
t25	.	.	.	-162.0898
t26	1.0000	1.0000	1.0000	10691.1135
t27	.	.	.	-8.5898
t28	.	.	.	-8.5898
t29	.	.	.	-751.1222
t30	.	.	.	-751.1222
t31	.	.	.	-751.1222
t32	.	.	.	-77.9323
t33	.	.	.	-153.9224
t34	1.0000	1.0000	1.0000	17860.5090
t35	1.0000	1.0000	1.0000	45585.2465

---- VAR Wbin Heat exchanger associated to state s exists

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	1.0000	EPS
ABCD	.	1.0000	1.0000	90.6302
BCDE	.	1.0000	1.0000	977.8812
ABC	.	.	1.0000	EPS
BCD	.	.	1.0000	EPS

CDE	.	.	1.0000	EPS
AB	.	.	1.0000	EPS
BC	.	.	1.0000	EPS
CD	.	.	1.0000	-232.1595
DE	.	1.0000	1.0000	1416.8674
A	.	1.0000	1.0000	EPS
B	.	1.0000	1.0000	EPS
C	.	1.0000	1.0000	EPS
D	.	.	1.0000	EPS
E	.	1.0000	1.0000	EPS

---- VAR W idem that Wbin but used to relax integrality of Wbin

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	.	1.5000
ABCD	.	1.0000	1.0000	.
BCDE	.	1.0000	1.0000	.
ABC	.	.	1.0000	.
BCD	.	.	1.0000	.
CDE	.	.	1.0000	.
AB	.	.	1.0000	.
BC	.	.	1.0000	.
CD	.	.	1.0000	.
DE	.	1.0000	1.0000	.
A	1.0000	1.0000	1.0000	52.1667
B	.	1.0000	1.0000	.
C	.	1.0000	1.0000	.
D	.	.	1.0000	.
E	1.0000	1.0000	1.0000	2037.5000

---- VAR z state s exists view note

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.0000	1.0000	.
ABCD	.	1.0000	1.0000	.
BCDE	.	1.0000	1.0000	.
ABC	.	.	1.0000	.
BCD	.	1.0000	1.0000	.
CDE	.	.	1.0000	.
AB	.	.	1.0000	.
BC	.	.	1.0000	.
CD	.	1.0000	1.0000	.
DE	.	1.0000	1.0000	.

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR zobj	-INF	383.3698	+INF	.
---- VAR zobj2	-INF	199.4407	+INF	.

  zobj objective function

---- VAR V1

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	2.6593	20.0000	.
ABCD	.	1.1721	20.0000	.
BCDE	.	1.2667	20.0000	.
ABC	.	1.1721	20.0000	.
BCD	.	1.1482	20.0000	.
CDE	.	.	20.0000	12.9340

AB	.	1.1721	20.0000	.
BC	.	1.1482	20.0000	.
CD	.	1.3842	20.0000	.
DE	.	2.4378	20.0000	.

---- VAR V2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	2.6593	20.0000	.
ABCD	.	1.1721	20.0000	.
BCDE	.	1.2667	20.0000	.
ABC	.	.	20.0000	.
BCD	.	1.0537	20.0000	.
CDE	.	1.2667	20.0000	.
AB	.	.	20.0000	0.9354
BC	.	.	20.0000	1.0090
CD	.	2.4378	20.0000	.
DE	.	2.4378	20.0000	.

---- VAR L1

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.6930	20.0000	.
ABCD	.	0.5721	20.0000	.
BCDE	.	0.8083	20.0000	.
ABC	.	0.5721	20.0000	.
BCD	.	0.7482	20.0000	.
CDE	.	.	20.0000	5.4734
AB	.	0.5721	20.0000	.
BC	.	0.7482	20.0000	.
CD	.	1.1842	20.0000	.
DE	.	2.2624	20.0000	.

---- VAR L2 total flows (kmol/h) of vapor and liquid in rec and str sections

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	3.6930	20.0000	.
ABCD	.	1.5383	20.0000	.
BCDE	.	1.8420	20.0000	.
ABC	.	.	20.0000	EPS
BCD	.	1.4783	20.0000	.
CDE	.	1.8420	20.0000	.
AB	.	.	20.0000	.
BC	.	.	20.0000	EPS
CD	.	2.6624	20.0000	.
DE	.	2.8378	20.0000	.

---- VAR F

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	2.0000	2.0000	.
ABCD	.	0.9662	2.0000	.
BCDE	.	1.0338	2.0000	.
ABC	.	0.6000	2.0000	.
BCD	.	0.8246	2.0000	.
CDE	.	0.5754	2.0000	.
AB	.	0.6000	2.0000	.
BC	.	0.4000	2.0000	.
CD	.	0.4246	2.0000	.

DE . 0.5754 2.0000 .

---- VAR D

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	0.9662	2.0000	.
ABCD	.	0.6000	2.0000	.
BCDE	.	0.4584	2.0000	.
ABC	.	0.6000	2.0000	.
BCD	.	0.4000	2.0000	.
CDE	.	.	2.0000	.
AB	.	0.6000	2.0000	.
BC	.	0.4000	2.0000	.
CD	.	0.2000	2.0000	.
DE	.	0.1754	2.0000	.

---- VAR B total flows (kmol/h) of feed, distillate and bottoms

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	1.0338	2.0000	.
ABCD	.	0.3662	2.0000	.
BCDE	.	0.5754	2.0000	.
ABC	.	.	2.0000	.
BCD	.	0.4246	2.0000	.
CDE	.	0.5754	2.0000	.
AB	.	.	2.0000	.
BC	.	.	2.0000	.
CD	.	0.2246	2.0000	.
DE	.	0.4000	2.0000	.

---- VAR Fi

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	.	0.6000	0.6000	.
ABCDE.B	.	0.4000	0.4000	.
ABCDE.C	.	0.2000	0.2000	.
ABCDE.D	.	0.4000	0.4000	.
ABCDE.E	.	0.4000	0.4000	.
ABCD .A	.	0.6000	0.6000	.
ABCD .B	.	0.0018	0.4000	.
ABCD .C	.	0.1970	0.2000	.
ABCD .D	.	0.1674	0.4000	.
ABCD .E	.	.	0.4000	.
BCDE .A	.	.	0.6000	22.3797
BCDE .B	.	0.3982	0.4000	.
BCDE .C	.	0.0030	0.2000	.
BCDE .D	.	0.2326	0.4000	.
BCDE .E	.	0.4000	0.4000	.
ABC .A	.	0.6000	0.6000	.
ABC .B	.	.	0.4000	.
ABC .C	.	.	0.2000	.
ABC .D	.	.	0.4000	.
ABC .E	.	.	0.4000	.
BCD .A	.	.	0.6000	EPS
BCD .B	.	0.4000	0.4000	.
BCD .C	.	0.2000	0.2000	.
BCD .D	.	0.2246	0.4000	.
BCD .E	.	.	0.4000	EPS
CDE .A	.	.	0.6000	.
CDE .B	.	.	0.4000	.

CDE	.C	.	0.2000	.
CDE	.D	0.1754	0.4000	.
CDE	.E	0.4000	0.4000	.
AB	.A	0.6000	0.6000	.
AB	.B	.	0.4000	.
AB	.C	.	0.2000	.
AB	.D	.	0.4000	.
AB	.E	.	0.4000	.
BC	.A	.	0.6000	.
BC	.B	0.4000	0.4000	EPS
BC	.C	.	0.2000	.
BC	.D	.	0.4000	.
BC	.E	.	0.4000	.
CD	.A	.	0.6000	.
CD	.B	.	0.4000	.
CD	.C	0.2000	0.2000	.
CD	.D	0.2246	0.4000	.
CD	.E	.	0.4000	.
DE	.A	.	0.6000	.
DE	.B	.	0.4000	.
DE	.C	.	0.2000	.
DE	.D	0.1754	0.4000	.
DE	.E	0.4000	0.4000	-122.8676

---- VAR Di

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.A	.	0.6000	0.6000	.
ABCDE.B	.	0.0018	0.4000	.
ABCDE.C	.	0.1970	0.2000	.
ABCDE.D	.	0.1674	0.4000	.
ABCDE.E	.	.	0.4000	.
ABCD .A	.	0.6000	0.6000	.
ABCD .B	.	.	0.4000	.
ABCD .C	.	.	0.2000	.
ABCD .D	.	.	0.4000	.
ABCD .E	.	.	0.4000	.
BCDE .A	.	.	0.6000	.
BCDE .B	.	0.3982	0.4000	.
BCDE .C	.	0.0030	0.2000	.
BCDE .D	.	0.0572	0.4000	.
BCDE .E	.	.	0.4000	.
ABC .A	.	0.6000	0.6000	EPS
ABC .B	.	.	0.4000	.
ABC .C	.	.	0.2000	.
ABC .D	.	.	0.4000	0.2162
ABC .E	.	.	0.4000	EPS
BCD .A	.	.	0.6000	23.1570
BCD .B	.	0.4000	0.4000	.
BCD .C	.	.	0.2000	.
BCD .D	.	.	0.4000	.
BCD .E	.	.	0.4000	.
CDE .A	.	.	0.6000	15.8271
CDE .B	.	.	0.4000	24.6951
CDE .C	.	.	0.2000	98.9094
CDE .D	.	.	0.4000	29.8887
CDE .E	.	.	0.4000	.
AB .A	.	0.6000	0.6000	-0.1437
AB .B	.	.	0.4000	.
AB .C	.	.	0.2000	0.1419
AB .D	.	.	0.4000	.
AB .E	.	.	0.4000	0.3035

BC	.A	.	0.6000	.
BC	.B	0.4000	0.4000	.
BC	.C	.	0.2000	0.2086
BC	.D	.	0.4000	0.3176
BC	.E	.	0.4000	0.4459
CD	.A	.	0.6000	7.4411
CD	.B	.	0.4000	5.5937
CD	.C	0.2000	0.2000	.
CD	.D	.	0.4000	.
CD	.E	.	0.4000	.
DE	.A	.	0.6000	1.9054
DE	.B	.	0.4000	13.9294
DE	.C	.	0.2000	.
DE	.D	0.1754	0.4000	.
DE	.E	.	0.4000	.

---- VAR Bi individual flows (kmol/h) of feed, distillate and bottoms

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.A	.	0.6000	.
ABCDE	.B	0.3982	0.4000	.
ABCDE	.C	0.0030	0.2000	.
ABCDE	.D	0.2326	0.4000	.
ABCDE	.E	0.4000	0.4000	.
ABCD	.A	.	0.6000	.
ABCD	.B	0.0018	0.4000	.
ABCD	.C	0.1970	0.2000	.
ABCD	.D	0.1674	0.4000	.
ABCD	.E	.	0.4000	.
BCDE	.A	.	0.6000	.
BCDE	.B	.	0.4000	.
BCDE	.C	.	0.2000	.
BCDE	.D	0.1754	0.4000	.
BCDE	.E	0.4000	0.4000	.
ABC	.A	.	0.6000	.
ABC	.B	.	0.4000	.
ABC	.C	.	0.2000	EPS
ABC	.D	.	0.4000	EPS
ABC	.E	.	0.4000	EPS
BCD	.A	.	0.6000	.
BCD	.B	.	0.4000	.
BCD	.C	0.2000	0.2000	.
BCD	.D	0.2246	0.4000	.
BCD	.E	.	0.4000	0.4737
CDE	.A	.	0.6000	.
CDE	.B	.	0.4000	.
CDE	.C	.	0.2000	.
CDE	.D	0.1754	0.4000	.
CDE	.E	0.4000	0.4000	.
AB	.A	.	0.6000	EPS
AB	.B	.	0.4000	.
AB	.C	.	0.2000	EPS
AB	.D	.	0.4000	EPS
AB	.E	.	0.4000	EPS
BC	.A	.	0.6000	.
BC	.B	.	0.4000	.
BC	.C	.	0.2000	.
BC	.D	.	0.4000	EPS
BC	.E	.	0.4000	EPS
CD	.A	.	0.6000	.
CD	.B	.	0.4000	.
CD	.C	.	0.2000	.

CD .D	.	0.2246	0.4000	.
CD .E	.	.	0.4000	.
DE .A	.	.	0.6000	.
DE .B	.	.	0.4000	.
DE .C	.	.	0.2000	.
DE .D	.	.	0.4000	.
DE .E	.	0.4000	0.4000	.

---- VAR rud Underwood root

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE.r1	4.0500	5.6521	10.4900	.
ABCDE.r2	1.7700	2.2265	4.0300	.
ABCDE.r3	1.3200	1.5437	1.7500	.
ABCDE.r4	1.0100	1.0954	1.3000	.
ABCD .r1	4.0500	4.0500	10.4900	6.4958
ABCD .r2	1.7700	2.3667	4.0300	.
ABCD .r3	1.3200	1.4344	1.7500	.
BCDE .r2	1.7700	2.0518	4.0300	.
BCDE .r3	1.3200	1.7500	1.7500	-12.5033
BCDE .r4	1.0100	1.1566	1.3000	.
ABC .r1	4.0500	7.2700	10.4900	EPS
ABC .r2	1.7700	2.9000	4.0300	EPS
BCD .r2	1.7700	2.3511	4.0300	.
BCD .r3	1.3200	1.4748	1.7500	.
CDE .r3	1.3200	1.3200	1.7500	EPS
CDE .r4	1.0100	1.0100	1.3000	EPS
AB .r1	4.0500	7.2700	10.4900	EPS
BC .r2	1.7700	2.9000	4.0300	EPS
CD .r3	1.3200	1.4548	1.7500	.
DE .r4	1.0100	1.1969	1.3000	.

---- VAR WR

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	1.0000	EPS
ABCD	.	.	1.0000	.
BCDE	.	1.0000	1.0000	.
ABC	.	.	1.0000	EPS
BCD	.	.	1.0000	.
CDE	.	.	1.0000	EPS
AB	.	.	1.0000	EPS
BC	.	.	1.0000	EPS
CD	.	.	1.0000	EPS
DE	.	1.0000	1.0000	.
A	.	.	1.0000	.
B	.	.	1.0000	.
C	.	.	1.0000	.
D	.	.	1.0000	.
E	.	1.0000	1.0000	.

---- VAR WC heat exchanger is a reboiler or a condenser

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	1.0000	.
ABCD	.	1.0000	1.0000	.
BCDE	.	.	1.0000	.
ABC	.	.	1.0000	.
BCD	.	.	1.0000	.
CDE	.	.	1.0000	.

AB	.	.	1.0000	.
BC	.	.	1.0000	.
CD	.	.	1.0000	.
DE	.	.	1.0000	.
A	.	1.0000	1.0000	.
B	.	1.0000	1.0000	.
C	.	1.0000	1.0000	.
D	.	.	1.0000	.
E	.	.	1.0000	.

---- VAR Qreb

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	10.0000	81.4400
ABCD	.	.	10.0000	81.4400
BCDE	.	0.9572	10.0000	.
ABC	.	.	10.0000	81.4400
BCD	.	.	10.0000	81.4400
CDE	.	.	10.0000	81.4400
AB	.	.	10.0000	81.4400
BC	.	.	10.0000	81.4400
CD	.	.	10.0000	81.4400
DE	.	0.4795	10.0000	.
A	.	.	10.0000	81.4400
B	.	.	10.0000	81.4400
C	.	.	10.0000	81.4400
D	.	.	10.0000	81.4400
E	.	0.9337	10.0000	.

---- VAR Qcond Heat load in reboiler and condenser

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	.	10.0000	3.0400
ABCD	.	0.8724	10.0000	.
BCDE	.	.	10.0000	3.0400
ABC	.	.	10.0000	3.0400
BCD	.	.	10.0000	3.0400
CDE	.	.	10.0000	3.0400
AB	.	.	10.0000	3.0400
BC	.	.	10.0000	3.0400
CD	.	.	10.0000	3.0400
DE	.	.	10.0000	3.0400
A	.	0.3607	10.0000	.
B	.	0.3811	10.0000	.
C	.	0.4925	10.0000	.
D	.	.	10.0000	3.0400
E	.	.	10.0000	3.0400

---- VAR Ar Area of columns s

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	0.1000	4.4612	25.0000	.
ABCD	0.1000	1.9663	25.0000	.
BCDE	0.1000	2.1250	25.0000	.
ABC	0.1000	2.0000	25.0000	EPS
BCD	0.1000	1.9263	25.0000	.
CDE	0.1000	0.1000	25.0000	EPS
AB	0.1000	2.0000	25.0000	EPS
BC	0.1000	0.9478	25.0000	EPS
CD	0.1000	4.0898	25.0000	.

DE	0.1000	4.0898	25.0000	.

---- VAR Volumen Volumen in the column t

	LOWER	LEVEL	UPPER	MARGINAL
t1	.	61.4721	+INF	.
t2	.	41.1754	+INF	.
t3	.	67.9931	+INF	.
t4	.	37.8655	+INF	.
t5	.	54.8446	+INF	.
t6	.	158.9609	+INF	.
t7	.	35.5664	+INF	.
t8	.	47.6891	+INF	.
t9	.	91.5556	+INF	.
t10	.	172.1615	+INF	.
t11	.	27.0944	+INF	.
t12	.	18.1485	+INF	.
t13	.	29.9686	+INF	.
t14	.	16.6896	+INF	.
t15	.	24.1733	+INF	.
t16	.	70.0635	+INF	.
t17	.	32.3863	+INF	.
t18	.	26.1234	+INF	.
t19	.	75.7158	+INF	.
t20	.	22.7151	+INF	.
t21	.	43.6095	+INF	.
t22	.	82.0035	+INF	.
t23	.	27.5583	+INF	.
t24	.	18.4592	+INF	.
t25	.	30.4817	+INF	.
t26	.	29.3585	+INF	.
t27	.	23.6811	+INF	.
t28	.	68.6371	+INF	.
t29	.	3.5632	+INF	.
t30	.	2.0522	+INF	.
t31	.	3.8590	+INF	.
t32	.	27.5583	+INF	.
t33	.	14.4448	+INF	.
t34	.	145.7245	+INF	.
t35	.	157.8259	+INF	.

---- VAR Vol Volume of the task s

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	35.5664	+INF	.
ABCD	.	27.0944	+INF	.
BCDE	.	43.6095	+INF	.
ABC	.	.	+INF	EPS
BCD	.	29.3585	+INF	.
CDE	.	.	+INF	EPS
AB	.	.	+INF	EPS
BC	.	.	+INF	EPS
CD	.	145.7245	+INF	.
DE	.	157.8259	+INF	.

---- VAR Cpisos Related to cost estimation

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	0.2840	+INF	.
ABCD	.	0.1459	+INF	.

BCDE	.	0.1539	+INF	.
ABC	.	0.1476	+INF	.
BCD	.	0.1439	+INF	.
CDE	.	0.0612	+INF	.
AB	.	0.1476	+INF	.
BC	.	0.0977	+INF	.
CD	.	0.2617	+INF	.
DE	.	0.2617	+INF	.
A	.	.	+INF	EPS
B	.	.	+INF	EPS
C	.	.	+INF	EPS
D	.	.	+INF	EPS
E	.	.	+INF	EPS

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR CostPisos	.	48.0874	+INF	.

---- VAR CP

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	2.6782	100.0000	.
ABCD	.	2.1667	100.0000	.
BCDE	.	3.1638	100.0000	.
ABC	.	.	100.0000	4.2200
BCD	.	2.3034	100.0000	.
CDE	.	.	100.0000	4.2200
AB	.	.	100.0000	4.2200
BC	.	.	100.0000	4.2200
CD	.	9.3295	100.0000	.
DE	.	10.0602	100.0000	.

---- VAR CostColumn

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	11.3020	1000.0000	.
ABCD	.	9.1433	1000.0000	.
BCDE	.	13.3514	1000.0000	.
ABC	.	.	1000.0000	.
BCD	.	9.7202	1000.0000	.
CDE	.	.	1000.0000	.
AB	.	.	1000.0000	.
BC	.	.	1000.0000	.
CD	.	39.3707	1000.0000	.
DE	.	42.4542	1000.0000	.
A	.	.	1000.0000	1.0000
B	.	.	1000.0000	1.0000
C	.	.	1000.0000	1.0000
D	.	.	1000.0000	1.0000
E	.	.	1000.0000	1.0000

---- VAR NumPisos

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	6.6205	+INF	.
ABCD	.	16.2986	+INF	.
BCDE	.	27.5374	+INF	.
ABC	.	.	+INF	0.1771
BCD	.	18.7347	+INF	.
CDE	.	.	+INF	0.0734

AB	.	.	+INF	0.1771
BC	.	.	+INF	0.1173
CD	.	52.7192	+INF	.
DE	.	57.6508	+INF	.
A	.	.	+INF	EPS
B	.	.	+INF	EPS
C	.	.	+INF	EPS
D	.	.	+INF	EPS
E	.	.	+INF	EPS

---- VAR VV max of V1 and V2

	LOWER	LEVEL	UPPER	MARGINAL
ABCDE	.	2.6593	50.0000	.
ABCD	.	1.1721	50.0000	.
BCDE	.	1.2667	50.0000	.
ABC	.	3.1721	50.0000	.
BCD	.	1.1482	50.0000	.
CDE	.	1.2667	50.0000	.
AB	.	3.1721	50.0000	.
BC	.	3.1482	50.0000	.
CD	.	2.4378	50.0000	.
DE	.	2.4378	50.0000	.

**** REPORT SUMMARY : 0 NONOPT
 0 INFEASIBLE
 0 UNBOUNDED
 0 ERRORS
 22 PROJECTED

---- 838 PARAMETER TOTAL = 2099579.978 dollars per year
PARAMETER ENERGY = 1994406.548 dollars per year
PARAMETER INVESTMENT = 105173.429 dollars per year

---- 839 VARIABLE y.L task t exists

t7 1.000, t11 1.000, t21 1.000, t26 1.000, t34 1.000, t35 1.000

---- 839 VARIABLE z.L state s exists view note

ABCDE 1.000, ABCD 1.000, BCDE 1.000, BCD 1.000, CD 1.000, DE 1.000

---- 839 VARIABLE WC.L heat exchanger is a reboiler or a condenser

ABCD 1.000, A 1.000, B 1.000, C 1.000

---- 839 VARIABLE WR.L

BCDE 1.000, DE 1.000, E 1.000

---- 839 PARAMETER HEATREBOILER Heat load of the reboiler in kW

BCDE 5317.519, DE 2663.618, E 5187.152

---- 839 PARAMETER HEATCONDENSER Heat load of the reboiler in kW

ABCD 4846.504, A 2003.628, B 2117.209, C 2736.009

---- 843 PARAMETER DIAMETER Column (pseudo-column) diameter in m

ABCDE 2.383, ABCD 1.582, BCDE 1.645, BCD 1.566, CD 2.282, DE 2.282

---- 843 VARIABLE NumPisos.L

ABCDE 6.621, ABCD 16.299, BCDE 27.537, BCD 18.735, CD 52.719, DE 57.
651

**** REPORT FILE SUMMARY

RES1 /var/www/html/interfaces/thermaldis/output.html

EXECUTION TIME = 38.492 SECONDS 5 MB 38.2.1 96226ea8 LEX-LEG

USER: Prof. Ignacio E. Grossmann G241203|0002AS-GEN
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**** FILE SUMMARY

Input /var/www/html/interfaces/cgi-bin/thermaldis/model.gms
Output /var/www/html/interfaces/cgi-bin/thermaldis/model.lst