```
"E:\1 □□□□\3 □□□□□\1 □□□□□□\1 □□□□□□□□\1_□□□□□□_□□□□\1_LW _□□□□\4 □□□□\3 python_code\1 exzample\2 □□□□□□\9 Code for this paper\Scripts\python.exe" "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --mode=client --port=33479

import sys; print('Python %s on %s' % (sys.version, sys.platform))
sys.path.extend(['E:\\1 □□□□\\3 □□□□□□\\1 □□□□□□□\\1 □□□□□□□□□\\1_□□□□□□_□□□□\\1_LW _□□□□\\4 □□□□\\3 python_code\\9 Code for this paper', 'E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□/1 □□□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□/4 □□□□/3 python_code/9 Code for this paper'])

PyDev console: starting.

Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
>>> runfile('E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□/4 □□□□/3 python_code/9 Code for this paper/main_RO_CCG.py', wdir='E:/1 □□□□/3 □□□□□/1 □□□□□□□/1 □□□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□/4 □□□□/3 python_code/9 Code for this paper')
Backend TkAgg is interactive backend. Turning interactive mode on.
Waiting 5s.....

Optimize the  ./R_15_1.xlsx  instance by CCG

      Master protblem status =  2 , is Optimal and MP obj =  528.0
The initial lb =  -inf       ub =  inf

The current iteration cnt =  0
      The SP model was solved Optimal 2 and SPObj =  528.0
      Master protblem status =  2 , is Optimal
      Deterministic Sub problem Status=  2 , is Optimal
      lb =  984.0                  ub =  984.0
       MPObj =  984.0     MP_delete_Hua_Obj =  556.0       Hua =  428.0       SPObj =  528.0       Deter_SP_Obj =  428.0

ub - lb =  0.0

Iteration cycle stopped by termination criterion 1: Because ub - lb <= eps, the iteration stop, and cnt =  0
    i:  0.0  l_i:  6.0  p_i:  8.0  al_i:  1.0       sol_a_i:  1.0  sol_g_i:  0.0  d_i:  15.0  sol_taoi:  1.0  sol_deltai:  13.0  sol_deltai - sol_taoi:  12.0  sol_taoP:  1.0  sol_deltaP:  4.0  sol_deltaP - sol_taoP:  3.0  cl_i:  2917497.0  sol_c_i:  2917497.0  sol_gp_i:  0.0  total work:  3954660.0  wasted work:  3.9339526027521963
    i:  1.0  l_i:  6.0  p_i:  19.0  al_i:  5.0  sol_a_i:  5.0  sol_g_i:  0.0  d_i:  11.0  sol_taoi:  5.0  sol_deltai:  9.0  sol_deltai - sol_taoi:  4.0  sol_taoP:  5.0  sol_deltaP:  6.0  sol_deltaP - sol_taoP:  1.0  cl_i:  1036171.0  sol_c_i:  1036171.0  sol_gp_i:  0.0  total work:  1186398.0  wasted work:  0.5698100468814007
    i:  2.0  l_i:  7.0  p_i:  25.0  al_i:  6.0  sol_a_i:  6.0  sol_g_i:  0.0  d_i:  20.0  sol_taoi:  6.0  sol_deltai:  18.0  sol_deltai - sol_taoi:  12.0  sol_taoP:  6.0  sol_deltaP:  8.0  sol_deltaP - sol_taoP:  2.0  cl_i:  3020678.0  sol_c_i:  3020678.0  sol_gp_i:  0.0  total work:  3163728.0  wasted work:  0.5425877319415575
    i:  3.0  l_i:  6.0  p_i:  19.0  al_i:  10.0  sol_a_i:  10.0  sol_g_i:  0.0  d_i:  16.0  sol_taoi:  10.0  sol_deltai:  14.0  sol_deltai - sol_taoi:  4.0  sol_taoP:  10.0  sol_deltaP:  11.0  sol_deltaP - sol_taoP:  1.0  cl_i:  1003327.0  sol_c_i:  1003327.0  sol_gp_i:  0.0  total work:  1186398.0  wasted work:  0.6943871280969792
    i:  4.0  l_i:  5.0  p_i:  14.0  al_i:  15.0  sol_a_i:  15.0  sol_g_i:  0.0  d_i:  34.0  sol_taoi:  15.0  sol_deltai:  32.0  sol_deltai - sol_taoi:  17.0  sol_taoP:  15.0  sol_deltaP:  19.0  sol_deltaP - sol_taoP:  4.0  cl_i:  4430235.0  sol_c_i:  4430235.0  sol_gp_i:  0.0  total work:  4481948.0  wasted work:  0.1961470771191455
    i:  5.0  l_i:  6.0  p_i:  19.0  al_i:  16.0  sol_a_i:  16.0  sol_g_i:  0.0  d_i:  25.0  sol_taoi:  16.0  sol_deltai:  23.0  sol_deltai - sol_taoi:  7.0  sol_taoP:  16.0  sol_deltaP:  18.0  sol_deltaP - sol_taoP:  2.0  cl_i:  1727656.0  sol_c_i:  1727656.0  sol_gp_i:  0.0  total work:  1977330.0  wasted work:  0.9470118796558996
    i:  6.0  l_i:  6.0  p_i:  8.0  al_i:  24.0  sol_a_i:  24.0  sol_g_i:  0.0  d_i:  38.0  sol_taoi:  24.0  sol_deltai:  36.0  sol_deltai - sol_taoi:  12.0  sol_taoP:  24.0  sol_deltaP:  27.0  sol_deltaP - sol_taoP:  3.0  cl_i:  3144664.0  sol_c_i:  3144664.0  sol_gp_i:  0.0  total work:  3163728.0  wasted work:  0.07230962965210663
    i:  7.0  l_i:  7.0  p_i:  24.0  al_i:  26.0  sol_a_i:  26.0  sol_g_i:  0.0  d_i:  34.0  sol_taoi:  26.0  sol_deltai:  32.0  sol_deltai - sol_taoi:  6.0  sol_taoP:  26.0  sol_deltaP:  27.0  sol_deltaP - sol_taoP:  1.0  cl_i:  1536740.0  sol_c_i:  1536740.0  sol_gp_i:  0.0  total work:  1581864.0  wasted work:  0.17115504240566826
    i:  8.0  l_i:  5.0  p_i:  19.0  al_i:  28.0  sol_a_i:  32.0  sol_g_i:  0.8  d_i:  61.0  sol_taoi:  32.0  sol_deltai:  53.0  sol_deltai - sol_taoi:  21.0  sol_taoP:  32.0  sol_deltaP:  36.0  sol_deltaP - sol_taoP:  4.0  cl_i:  5432806.0  sol_c_i:  6225303.892857143  sol_gp_i:  0.5009899035929403  total work:  6327456.0  wasted work:  0.3874622868066684
    i:  9.0  l_i:  7.0  p_i:  -0.0  al_i:  31.0  sol_a_i:  33.0  sol_g_i:  0.25  d_i:  54.0  sol_taoi:  33.0  sol_deltai:  38.0  sol_deltai - sol_taoi:  5.0  sol_taoP:  33.0  sol_deltaP:  35.0  sol_deltaP - sol_taoP:  2.0  cl_i:  1122221.0  sol_c_i:  1581864.0  sol_gp_i:  0.43585573728209254  total work:  1581864.0  wasted work:  0.0
    i:  10.0  l_i:  5.0  p_i:  14.0  al_i:  33.0  sol_a_i:  35.0  sol_g_i:  0.2  d_i:  72.0  sol_taoi:  35.0  sol_deltai:  52.0  sol_deltai - sol_taoi:  17.0  sol_taoP:  35.0  sol_deltaP:  39.0  sol_deltaP - sol_taoP:  4.0  cl_i:  4319864.0  sol_c_i:  5141058.0  sol_gp_i:  0.7786958929465492  total work:  5536524.0  wasted work:  1.5
    i:  11.0  l_i:  6.0  p_i:  8.0  al_i:  33.0  sol_a_i:  40.0  sol_g_i:  1.0  d_i:  65.0  sol_taoi:  40.0  sol_deltai:  56.0  sol_deltai - sol_taoi:  16.0  sol_taoP:  40.0  sol_deltaP:  44.0  sol_deltaP - sol_taoP:  4.0  cl_i:  3993564.0  sol_c_i:  4481948.0  sol_gp_i:  0.26463391109656526  total work:  4481948.0  wasted work:  0.0
    i:  12.0  l_i:  6.0  p_i:  24.0  al_i:  38.0  sol_a_i:  39.0  sol_g_i:  0.14285714285714285  d_i:  63.0  sol_taoi:  39.0  sol_deltai:  48.0  sol_deltai - sol_taoi:  9.0  sol_taoP:  39.0  sol_deltaP:  41.0  sol_deltaP - sol_taoP:  2.0  cl_i:  2342507.0  sol_c_i:  2504618.0  sol_gp_i:  0.3074429913064587  total work:  2636440.0  wasted work:  0.5
    i:  13.0  l_i:  7.0  p_i:  24.0  al_i:  45.0  sol_a_i:  50.0  sol_g_i:  0.8333333333333334  d_i:  72.0  sol_taoi:  50.0  sol_deltai:  63.0  sol_deltai - sol_taoi:  13.0  sol_taoP:  50.0  sol_deltaP:  53.0  sol_deltaP - sol_taoP:  3.0  cl_i:  3386423.0  sol_c_i:  4704643.0  sol_gp_i:  1.0  total work:  4745592.0  wasted work:  0.1553192941997542
    i:  14.0  l_i:  5.0  p_i:  9.0  al_i:  50.0  sol_a_i:  56.964285714285715  sol_g_i:  0.7738095238095238  d_i:  82.0  sol_taoi:  57.0  sol_deltai:  69.0  sol_deltai - sol_taoi:  12.0  sol_taoP:  57.0  sol_deltaP:  60.0  sol_deltaP - sol_taoP:  3.0  cl_i:  2979427.0  sol_c_i:  4481948.0  sol_gp_i:  0.7123815637753941  total work:  4481948.0  wasted work:  0.0
Time: 240.000000
```