```
 1  "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=32269
 2
 3  import sys; print('Python %s on %s' % (sys.version, sys.platform))
 4  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_LW _□□□□□/4 □□□□/3 python_code/9 Code for this paper'])
 5
 6  PyDev console: starting.
 7
 8  Python 3.9.7 (tags/v3.9.7:1016ef3, Aug 30 2021, 20:19:38) [MSC v.1929 64 bit (AMD64)] on win32
 9  >>> 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')
10  Backend TkAgg is interactive backend. Turning interactive mode on.
11  Waiting 5s......
12
13  Optimize the  ./R_14_1.xlsx  instance by CCG
14
15      Master protblem status =  2 , is Optimal and MP obj =  549.0
16  The initial lb =  -inf      ub =  inf
17
18  The current iteration cnt =  0
19      The SP model was solved Optimal 2 and SPObj =  549.0
20      Master protblem status =  2 , is Optimal
21      Deterministic Sub problem Status=  2 , is Optimal
22      lb =  1060.0              ub =  1060.0
23       MPObj =  1060.0       MP_delete_Hua_Obj =  578.0       Hua =  482.0       SPObj =  549.0       Deter_SP_Obj =  482.0
24
25  ub - lb =  0.0
26
27  Iteration cycle stopped by termination criterion 1: Because ub - lb <= eps, the iteration stop, and cnt =  0
28     i:  0.0  l_i:  7.0   p_i:  0.0  al_i:  55.0      sol_a_i:  55.0 sol_g_i:  0.0   d_i:  70.0   sol_taoi:  55.0    sol_deltai:  61.0 sol_deltai - sol_taoi:  6.0    sol_taoP:
       55.0   sol_deltaP:  57.0    sol_deltaP - sol_taoP:  2.0  cI_i:  1505643.0    sol_c_i:  1505643.0  sol_gp_i:  0.0  total work:  1581864.0   wasted work:  0.
       2891057638330476
29     i:  1.0  l_i:  5.0   p_i:  10.0  al_i:  2.0       sol_a_i:  2.0  sol_g_i:  0.0   d_i:  23.0   sol_taoi:  2.0  sol_deltai:  14.0 sol_deltai - sol_taoi:  12.0 sol_taoP:  2
       .0    sol_deltaP:  4.0  sol_deltaP - sol_taoP:  2.0  cI_i:  2973618.0    sol_c_i:  2973618.0  sol_gp_i:  0.0  total work:  3163728.0   wasted work:  0.
       7210860099224712
30     i:  2.0  l_i:  6.0   p_i:  15.0  al_i:  8.0       sol_a_i:  8.0  sol_g_i:  0.0   d_i:  29.0   sol_taoi:  8.0  sol_deltai:  20.0 sol_deltai - sol_taoi:  12.0 sol_taoP:  8
       .0    sol_deltaP:  10.0    sol_deltaP - sol_taoP:  2.0  cI_i:  2936429.0    sol_c_i:  2936429.0  sol_gp_i:  0.0  total work:  3031906.0   wasted work:  0.
       36214364825294715
31     i:  3.0  l_i:  7.0   p_i:  21.0  al_i:  11.0      sol_a_i:  11.0 sol_g_i:  0.0   d_i:  33.0   sol_taoi:  11.0    sol_deltai:  24.0 sol_deltai - sol_taoi:  13.0 sol_taoP
       :  11.0  sol_deltaP:  14.0    sol_deltaP - sol_taoP:  3.0  cI_i:  3182410.0    sol_c_i:  3182410.0  sol_gp_i:  0.0  total work:  3295550.0   wasted work:  0.
       4291392938963147
32     i:  4.0  l_i:  6.0   p_i:  28.0  al_i:  17.0      sol_a_i:  17.0 sol_g_i:  0.0   d_i:  35.0   sol_taoi:  17.0    sol_deltai:  26.0 sol_deltai - sol_taoi:  9.0    sol_taoP
       :  17.0  sol_deltaP:  19.0    sol_deltaP - sol_taoP:  2.0  cI_i:  2209546.0    sol_c_i:  2209546.0  sol_gp_i:  0.0  total work:  2240974.0   wasted work:  0.
       1192062023031057
33     i:  5.0  l_i:  6.0   p_i:  15.0  al_i:  23.0      sol_a_i:  23.0 sol_g_i:  0.0   d_i:  42.0   sol_taoi:  23.0    sol_deltai:  33.0 sol_deltai - sol_taoi:  10.0 sol_taoP
       :  23.0  sol_deltaP:  25.0    sol_deltaP - sol_taoP:  2.0  cI_i:  2535577.0    sol_c_i:  2535577.0  sol_gp_i:  0.0  total work:  2768262.0   wasted work:  0.
       8825727116869718
34     i:  6.0  l_i:  6.0   p_i:  22.0  al_i:  27.0      sol_a_i:  27.0 sol_g_i:  0.0   d_i:  44.0   sol_taoi:  27.0    sol_deltai:  35.0 sol_deltai - sol_taoi:  8.0    sol_taoP
       :  27.0  sol_deltaP:  29.0    sol_deltaP - sol_taoP:  2.0  cI_i:  1982104.0    sol_c_i:  1982104.0  sol_gp_i:  0.0  total work:  2109152.0   wasted work:  0.
       4818922486383153
35    i:  7.0  l_i:  5.0   p_i:  10.0  al_i:  29.0      sol_a_i:  33.0 sol_g_i:  0.8   d_i:  58.0   sol_taoi:  33.0    sol_deltai:  43.0 sol_deltai - sol_taoi:  10.0 sol_taoP
       :  33.0  sol_deltaP:  36.0    sol_deltaP - sol_taoP:  3.0  cI_i:  2581574.0    sol_c_i:  3756857.45 sol_gp_i:  0.7429737638633918   total work:  4086482.0
       wasted work:  1.250263802703645
36     i:  8.0  l_i:  5.0   p_i:  5.0  al_i:  30.0      sol_a_i:  33.0 sol_g_i:  0.37500000000000966   d_i:  69.0   sol_taoi:  33.0    sol_deltai:  47.0 sol_deltai -
       sol_taoi:  14.0 sol_taoP:  33.0   sol_deltaP:  37.0    sol_deltaP - sol_taoP:  4.0  cI_i:  3539325.0    sol_c_i:  3539325.0  sol_gp_i:  0.0  total work:  3691016.0
       wasted work:  0.5753629894858218
37     i:  9.0  l_i:  5.0   p_i:  18.0  al_i:  37.0      sol_a_i:  42.71031746031746   sol_g_i:  0.5710317460317293  d_i:  75.0   sol_taoi:  43.0    sol_deltai:  52.0
       sol_deltai - sol_taoi:  9.0    sol_taoP:  43.0   sol_deltaP:  45.0    sol_deltaP - sol_taoP:  2.0  cI_i:  2316876.0    sol_c_i:  2636440.0  sol_gp_i:  0.
       3030260502799229   total work:  2636440.0   wasted work:  0.0
38     i:  10.0  l_i:  7.0   p_i:  23.0  al_i:  38.0      sol_a_i:  40.0 sol_g_i:  0.2857142857142857  d_i:  65.0   sol_taoi:  40.0    sol_deltai:  44.0 sol_deltai -
       sol_taoi:  4.0    sol_taoP:  40.0   sol_deltaP:  42.0    sol_deltaP - sol_taoP:  2.0  cI_i:  1000784.0    sol_c_i:  2846292.0  sol_gp_i:  1.0  total work:  3031906.0
       wasted work:  0.7040327107766534
39     i:  11.0  l_i:  5.0   p_i:  9.0  al_i:  46.0      sol_a_i:  52.0 sol_g_i:  0.8571428571428571  d_i:  77.0   sol_taoi:  52.0    sol_deltai:  60.0 sol_deltai -
       sol_taoi:  8.0    sol_taoP:  52.0   sol_deltaP:  54.0    sol_deltaP - sol_taoP:  2.0  cI_i:  1874122.0    sol_c_i:  2372796.0  sol_gp_i:  0.9457336408186797
       total work:  2372796.0    wasted work:  0.0
40     i:  12.0  l_i:  7.0   p_i:  14.0  al_i:  49.0      sol_a_i:  53.0 sol_g_i:  0.6666666666666666  d_i:  76.0   sol_taoi:  53.0    sol_deltai:  59.0 sol_deltai -
       sol_taoi:  6.0    sol_taoP:  53.0   sol_deltaP:  54.0    sol_deltaP - sol_taoP:  1.0  cI_i:  1383135.0    sol_c_i:  1581864.0  sol_gp_i:  0.15075556432158516
       total work:  1581864.0    wasted work:  0.0
41     i:  13.0  l_i:  6.0   p_i:  21.0  al_i:  50.0      sol_a_i:  54.0 sol_g_i:  0.4444444444444444  d_i:  83.0   sol_taoi:  54.0    sol_deltai:  60.0 sol_deltai -
       sol_taoi:  6.0    sol_taoP:  54.0   sol_deltaP:  56.0    sol_deltaP - sol_taoP:  2.0  cI_i:  1355107.0    sol_c_i:  3163728.0  sol_gp_i:  0.8575109807164206
       total work:  3163728.0    wasted work:  0.0
42  Time: 329.000000
43
44
45
46
```