```
 1  D:\Python\Python\setroute\python.exe "D:\Python\Pycharm\setroute\PyCharm Community Edition 2021.2.3\plugins\python-ce\helpers\pydev\pydevconsole.py" --
    mode=client --port=27039
 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 _□□□□1\\4 □□□□\\3 python_code\\9 Code for this
    paper', 'E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□1/4 □□□□/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 _□□□□1/4 □□□□/3 python_code/9 Code for this paper/
    main_RO_CCG.py', wdir='E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□_□□□□/1_LW _□□□□1/4 □□□□/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_18_5.xlsx  instance by CCG
14
15      Master protblem status =  2 , is Optimal and MP obj =  835.0
16  The initial lb =  -inf      ub =  inf
17
18  The current iteration cnt =  0
19      The SP model was solved Optimal 2 and SPObj =  835.0
20      Deterministic Sub problem Status=  2 , is Optimal
21      lb =  1517.0              ub =  1517.0
22       MPObj =  1517.0       MP_delete_Hua_Obj =  867.0       Hua =  650.0       SPObj =  835.0       Deter_SP_Obj =  650.0
23
24  ub - lb =  0.0
25
26  Iteration cycle stopped by termination criterion 1: Because ub - lb <= eps, the iteration stop, and cnt =  0
27      i: 0.0  l_i: 4.0   p_i: 15.0   al_i: 48.0     sol_a_i: 48.0 sol_g_i: 0.0   d_i: 59.0   sol_taoi: 48.0    sol_deltai: 62.0  sol_deltai - taoi: 14.0  sol_taoP
    : 48.0  sol_deltaP: 53.0    sol_deltaP - sol_taoP: 5.0  cl_i: 3676266.0    sol_c_i: 3676266.0   sol_gp_i: 0.0  total work: 3691016.0   wasted work: 0.
    05594665533825917
28      i: 1.0  l_i: 5.0   p_i: 2.0   al_i: 33.0     sol_a_i: 33.0 sol_g_i: 0.0   d_i: 43.0   sol_taoi: 33.0    sol_deltai: 46.0  sol_deltai - sol_taoi: 13.0  sol_taoP:
    33.0   sol_deltaP: 38.0    sol_deltaP - sol_taoP: 5.0  cl_i: 3220010.0    sol_c_i: 3220010.0   sol_gp_i: 0.0  total work: 3427372.0   wasted work: 0.
    786522735203532
29      i: 2.0  l_i: 5.0   p_i: 24.0   al_i: 2.0     sol_a_i: 2.0 sol_g_i: 0.0   d_i: 16.0   sol_taoi: 2.0    sol_deltai: 20.0  sol_deltai - sol_taoi: 18.0  sol_taoP: 2
    .0   sol_deltaP: 8.0   sol_deltaP - sol_taoP: 6.0  cl_i: 4544344.0    sol_c_i: 4544344.0   sol_gp_i: 0.0  total work: 5009236.0   wasted work: 1.
    7633323724416259
30      i: 3.0  l_i: 5.0   p_i: 19.0   al_i: 55.0     sol_a_i: 55.0 sol_g_i: 0.0   d_i: 68.0   sol_taoi: 55.0    sol_deltai: 72.0  sol_deltai - sol_taoi: 17.0  sol_taoP
    : 55.0  sol_deltaP: 60.0    sol_deltaP - sol_taoP: 5.0  cl_i: 4352300.0    sol_c_i: 4352300.0   sol_gp_i: 0.0  total work: 4481948.0   wasted work: 0.
    49175403195217793
31      i: 4.0  l_i: 5.0   p_i: 7.0   al_i: 31.0     sol_a_i: 31.0 sol_g_i: 0.0   d_i: 39.0   sol_taoi: 31.0    sol_deltai: 42.0  sol_deltai - sol_taoi: 11.0  sol_taoP:
    31.0   sol_deltaP: 33.0    sol_deltaP - sol_taoP: 2.0  cl_i: 2816559.0    sol_c_i: 2816559.0   sol_gp_i: 0.0  total work: 2900084.0   wasted work: 0.
    31680978895783707
32      i: 5.0  l_i: 5.0   p_i: 29.0   al_i: 57.0     sol_a_i: 57.0 sol_g_i: 0.0   d_i: 69.0   sol_taoi: 57.0    sol_deltai: 73.0  sol_deltai - sol_taoi: 16.0  sol_taoP
    : 57.0  sol_deltaP: 62.0    sol_deltaP - sol_taoP: 5.0  cl_i: 4160344.0    sol_c_i: 4160344.0   sol_gp_i: 0.0  total work: 4218304.0   wasted work: 0.
    21984190802749162
33      i: 6.0  l_i: 6.0   p_i: 0.0   al_i: 49.0     sol_a_i: 49.0 sol_g_i: 0.0   d_i: 65.0   sol_taoi: 49.0    sol_deltai: 70.0  sol_deltai - sol_taoi: 21.0  sol_taoP:
    49.0   sol_deltaP: 55.0    sol_deltaP - sol_taoP: 6.0  cl_i: 5510827.0    sol_c_i: 5510827.0   sol_gp_i: 0.0  total work: 5800168.0   wasted work: 1.
    09746855608320320
34      i: 7.0  l_i: 5.0   p_i: 14.0   al_i: 57.0     sol_a_i: 57.0 sol_g_i: 0.0   d_i: 72.0   sol_taoi: 63.0    sol_deltai: 82.0  sol_deltai - sol_taoi: 19.0  sol_taoP
    : 63.0  sol_deltaP: 67.0    sol_deltaP - sol_taoP: 4.0  cl_i: 4918991.0    sol_c_i: 4918991.0   sol_gp_i: 0.0  total work: 5009236.0   wasted work: 0.
    34229870583058974
35      i: 8.0  l_i: 5.0   p_i: 29.0   al_i: 24.0     sol_a_i: 24.0 sol_g_i: 0.0   d_i: 38.0   sol_taoi: 24.0    sol_deltai: 42.0  sol_deltai - sol_taoi: 18.0  sol_taoP
    : 24.0  sol_deltaP: 28.0    sol_deltaP - sol_taoP: 4.0  cl_i: 4689476.0    sol_c_i: 4689476.0   sol_gp_i: 0.0  total work: 4877414.0   wasted work: 0.
    7128476278618137
36      i: 9.0  l_i: 5.0   p_i: 7.0   al_i: 19.0     sol_a_i: 19.0 sol_g_i: 0.0   d_i: 25.0   sol_taoi: 19.0    sol_deltai: 27.0  sol_deltai - sol_taoi: 8.0   sol_taoP:
    19.0   sol_deltaP: 21.0    sol_deltaP - sol_taoP: 2.0  cl_i: 2049802.0    sol_c_i: 2049802.0   sol_gp_i: 0.0  total work: 2109152.0   wasted work: 0.
    22511416910682588
37      i: 10.0   l_i: 4.0   p_i: 20.0   al_i: 14.0     sol_a_i: 14.0 sol_g_i: 0.0   d_i: 31.0   sol_taoi: 14.0    sol_deltai: 36.0  sol_deltai - sol_taoi: 22.0
    sol_taoP: 14.0    sol_deltaP: 18.0    sol_deltaP - sol_taoP: 4.0  cl_i: 5630440.0    sol_c_i: 5630440.0   sol_gp_i: 0.0  total work: 5800168.0   wasted work
    : 0.6437772147289527
38      i: 11.0   l_i: 4.0   p_i: 16.0   al_i: 16.0     sol_a_i: 18.0 sol_g_i: 0.4   d_i: 33.0   sol_taoi: 18.0    sol_deltai: 40.0  sol_deltai - sol_taoi: 22.0
    sol_taoP: 18.0    sol_deltaP: 23.0    sol_deltaP - sol_taoP: 5.0  cl_i: 5685943.0    sol_c_i: 6063812.0   sol_gp_i: 0.35831367298326533  total work:
    6195634.0   wasted work: 0.5
39      i: 12.0   l_i: 5.0   p_i: 9.0   al_i: 43.0     sol_a_i: 44.0 sol_g_i: 0.12500000000001957   d_i: 64.0   sol_taoi: 44.0    sol_deltai: 68.0  sol_deltai -
    sol_taoi: 24.0 sol_taoP: 44.0   sol_deltaP: 49.0    sol_deltaP - sol_taoP: 5.0  cl_i: 6148730.0    sol_c_i: 6459278.0   sol_gp_i: 0.16827236728315456
    total work: 6591100.0    wasted work: 0.5
40      i: 13.0   l_i: 4.0   p_i: 12.0   al_i: 10.0     sol_a_i: 20.0 sol_g_i: 1.0   d_i: 25.0   sol_taoi: 20.0    sol_deltai: 37.0  sol_deltai - sol_taoi: 17.0
    sol_taoP: 20.0    sol_deltaP: 25.0    sol_deltaP - sol_taoP: 5.0  cl_i: 4259705.0    sol_c_i: 4786993.0   sol_gp_i: 1.0  total work: 4877414.0   wasted work
    : 0.3429662727010666
41      i: 14.0   l_i: 4.0   p_i: 30.0   al_i: 7.0     sol_a_i: 8.0  sol_g_i: 0.14285714285714285   d_i: 22.0   sol_taoi: 8.0    sol_deltai: 20.0  sol_deltai -
    sol_taoi: 12.0 sol_taoP: 8.0 sol_deltaP: 12.0    sol_deltaP - sol_taoP: 4.0  cl_i: 3009945.0    sol_c_i: 3691016.0   sol_gp_i: 0.5166595864119798    total
    work: 3691016.0    wasted work: 0.0
42      i: 15.0   l_i: 5.0   p_i: 24.0   al_i: 23.0     sol_a_i: 29.0 sol_g_i: 0.8571428571428571  d_i: 34.0   sol_taoi: 29.0    sol_deltai: 43.0  sol_deltai -
    sol_taoi: 14.0 sol_taoP: 29.0   sol_deltaP: 35.0    sol_deltaP - sol_taoP: 6.0  cl_i: 3554496.0    sol_c_i: 5272880.0   sol_gp_i: 0.8147274354811792
    total work: 5536524.0   wasted work: 1.0
43      i: 16.0   l_i: 6.0  p_i: 8.0  al_i: 0.0     sol_a_i: 4.0  sol_g_i: 0.6666666666666666  d_i: 10.0   sol_taoi: 4.0  sol_deltai: 14.0  sol_deltai - sol_taoi:
    10.0    sol_taoP: 4.0 sol_deltaP: 6.0  sol_deltaP - sol_taoP: 2.0  cl_i: 2501602.0    sol_c_i: 3132757.2499999995 sol_gp_i: 0.4787935625312919    total
    work: 3295550.0    wasted work: 0.6174718559876214
44      i: 17.0   l_i: 5.0   p_i: 24.0    al_i: 43.0     sol_a_i: 50.274999999999736 sol_g_i: 0.8083333333333034 d_i: 64.0   sol_taoi: 51.0    sol_deltai: 73.0
    sol_deltai - sol_taoi: 22.0 sol_taoP: 51.0   sol_deltaP: 57.0    sol_deltaP - sol_taoP: 6.0  cl_i: 5719528.0    sol_c_i: 7118388.0   sol_gp_i: 0.
    663233375309129   total work: 7118388.0   wasted work: 0.0
```

```
45   Time: 1552.000000
46
47
48
49
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