```
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=31649
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_ExtendedByMe.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_16_5.xlsx  instance by ECCG
14
15     Master protblem status = 2 , is Optimal and MP obj = 700.0
16 The initial lb = -inf      ub = inf
17
18 The current iteration cnt = 0
19     The SP model was solved Optimal 2 and SPObj = 700.0
20     Deterministic Sub problem Status= 2 , is Optimal
21     Master protblem status = 2 , is Optimal
22     lb = 1259.0              ub = 1259.0
23      MPObj = 1259.0     MP_delete_Hua_Obj = 723.0     Hua = 536.0     SPObj = 700.0     Deter_SP_Obj = 536.0
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: 4.0 p_i: 24.0 al_i: 21.0   sol_a_i: 21.0 sol_g_i: 0.0 d_i: 31.0 sol_taoi: 21.0   sol_deltai: 31.0 sol_deltai - sol_taoi: 10.0 sol_taoP: 21.0 sol_deltaP: 24.0   sol_deltaP - sol_taoP: 3.0 cl_i: 2564346.0   sol_c_i: 2564346.0 sol_gp_i: 0.0 total work: 2768262.0   wasted work: 0.7734520793190818

29   i: 1.0 l_i: 4.0 p_i: 14.0 al_i: 37.0   sol_a_i: 37.0 sol_g_i: 0.0 d_i: 50.0 sol_taoi: 37.0   sol_deltai: 50.0 sol_deltai - sol_taoi: 13.0 sol_taoP: 37.0 sol_deltaP: 40.0   sol_deltaP - sol_taoP: 3.0 cl_i: 3378522.0   sol_c_i: 3378522.0 sol_gp_i: 0.0 total work: 3427372.0   wasted work: 0.18528773649314986

30   i: 2.0 l_i: 6.0 p_i: 22.0 al_i: 47.0   sol_a_i: 47.0 sol_g_i: 0.0 d_i: 62.0 sol_taoi: 47.0   sol_deltai: 62.0 sol_deltai - sol_taoi: 15.0 sol_taoP: 47.0 sol_deltaP: 50.0   sol_deltaP - sol_taoP: 3.0 cl_i: 3846651.0   sol_c_i: 3846651.0 sol_gp_i: 0.0 total work: 3954660.0   wasted work: 0.40967744382576504

31   i: 3.0 l_i: 6.0 p_i: 16.0 al_i: 1.0   sol_a_i: 1.0 sol_g_i: 0.0 d_i: 18.0 sol_taoi: 1.0 sol_deltai: 18.0 sol_deltai - sol_taoi: 17.0 sol_taoP: 1.0 sol_deltaP: 7.0 sol_deltaP - sol_taoP: 6.0 cl_i: 4246384.0   sol_c_i: 4246384.0 sol_gp_i: 0.0 total work: 4350126.0   wasted work: 0.39934927402102836

32   i: 4.0 l_i: 4.0 p_i: 0.0 al_i: 11.0   sol_a_i: 11.0 sol_g_i: 0.0 d_i: 36.0 sol_taoi: 11.0   sol_deltai: 36.0 sol_deltai - sol_taoi: 25.0 sol_taoP: 11.0   sol_deltaP: 21.0   sol_deltaP - sol_taoP: 10.0 cl_i: 6440269.0   sol_c_i: 6440269.0 sol_gp_i: 0.0 total work: 6854744.0   wasted work: 1.5721010150050827

33   i: 5.0 l_i: 6.0 p_i: 22.0 al_i: 2.0   sol_a_i: 2.0 sol_g_i: 0.0 d_i: 19.0 sol_taoi: 2.0 sol_deltai: 19.0 sol_deltai - sol_taoi: 17.0 sol_taoP: 2.0 sol_deltaP: 5.0 sol_deltaP - sol_taoP: 3.0 cl_i: 4398544.0   sol_c_i: 4398544.0 sol_gp_i: 0.0 total work: 4481948.0   wasted work: 0.31635083673438424

34   i: 6.0 l_i: 7.0 p_i: 7.0 al_i: 64.0   sol_a_i: 64.0 sol_g_i: 0.0 d_i: 82.0 sol_taoi: 64.0   sol_deltai: 82.0 sol_deltai - sol_taoi: 18.0 sol_taoP: 64.0   sol_deltaP: 68.0   sol_deltaP - sol_taoP: 4.0 cl_i: 4627375.0   sol_c_i: 4627375.0 sol_gp_i: 0.0 total work: 4877414.0   wasted work: 0.9483963223134226

35   i: 7.0 l_i: 7.0 p_i: 21.0 al_i: 37.0   sol_a_i: 37.0 sol_g_i: 0.0 d_i: 45.0 sol_taoi: 37.0   sol_deltai: 45.0 sol_deltai - sol_taoi: 8.0 sol_taoP: 37.0 sol_deltaP: 39.0   sol_deltaP - sol_taoP: 2.0 cl_i: 2064742.0   sol_c_i: 2064742.0 sol_gp_i: 0.0 total work: 2240974.0   wasted work: 0.6684468449879383

36   i: 8.0 l_i: 5.0 p_i: 4.0 al_i: 8.0   sol_a_i: 8.0 sol_g_i: 0.0 d_i: 27.0 sol_taoi: 8.0 sol_deltai: 27.0 sol_deltai - sol_taoi: 19.0 sol_taoP: 8.0 sol_deltaP: 18.0   sol_deltaP - sol_taoP: 10.0 cl_i: 4957402.0   sol_c_i: 4957402.0 sol_gp_i: 0.0 total work: 5009236.0   wasted work: 0.19660602934259835

37   i: 9.0 l_i: 7.0 p_i: 9.0 al_i: 4.0   sol_a_i: 4.0 sol_g_i: 0.0 d_i: 31.0 sol_taoi: 4.0 sol_deltai: 28.0 sol_deltai - sol_taoi: 24.0 sol_taoP: 4.0 sol_deltaP: 9.0 sol_deltaP - sol_taoP: 5.0 cl_i: 6090104.0   sol_c_i: 7195472.857142857   sol_gp_i: 0.6987761635278741   total work: 7250210.0 wasted work: 0.20761763156810975

38   i: 10.0 l_i: 5.0 p_i: 28.0 al_i: 48.0   sol_a_i: 56.0 sol_g_i: 1.0 d_i: 69.0 sol_taoi: 56.0   sol_deltai: 76.0 sol_deltai - sol_taoi: 20.0 sol_taoP: 56.0 sol_deltaP: 62.0   sol_deltaP - sol_taoP: 6.0 cl_i: 5195384.0   sol_c_i: 5195384.0 sol_gp_i: 0.0 total work: 5536524.0   wasted work: 1.2939418306504225

39   i: 11.0 l_i: 7.0 p_i: 7.0 al_i: 27.0   sol_a_i: 32.0 sol_g_i: 0.5 d_i: 42.0 sol_taoi: 32.0   sol_deltai: 46.0 sol_deltai - sol_taoi: 14.0 sol_taoP: 32.0 sol_deltaP: 35.0   sol_deltaP - sol_taoP: 3.0 cl_i: 3674443.0   sol_c_i: 4481948.0 sol_gp_i: 0.7657153206596774   total work: 4745592.0 wasted work: 1.0

40   i: 12.0 l_i: 7.0 p_i: 17.0 al_i: 10.0   sol_a_i: 16.3 sol_g_i: 0.9 d_i: 24.0 sol_taoi: 20.0   sol_deltai: 34.0 sol_deltai - sol_taoi: 14.0 sol_taoP: 20.0 sol_deltaP: 27.0   sol_deltaP - sol_taoP: 7.0 cl_i: 3449685.0   sol_c_i: 4613770.0 sol_gp_i: 0.6307667048855925   total work: 4745592.0   wasted work: 0.5

41   i: 13.0 l_i: 5.0 p_i: 0.0 al_i: 37.0   sol_a_i: 40.0 sol_g_i: 0.42857142857142855 d_i: 67.0 sol_taoi: 40.0   sol_deltai: 65.0 sol_deltai - sol_taoi: 25.0 sol_taoP: 40.0 sol_deltaP: 53.0   sol_deltaP - sol_taoP: 13.0 cl_i: 6370527.0   sol_c_i: 6591100.0 sol_gp_i: 0.41831598670935055   total work: 6591100.0   wasted work: 0.0

42   i: 14.0 l_i: 6.0 p_i: 28.0 al_i: 11.0   sol_a_i: 15.361904761904762 sol_g_i: 0.726984126984127   d_i: 34.0 sol_taoi: 16.0   sol_deltai: 38.0 sol_deltai - sol_taoi: 22.0 sol_taoP: 16.0 sol_deltaP: 22.0   sol_deltaP - sol_taoP: 6.0 cl_i: 5654254.0   sol_c_i: 6854744.0 sol_gp_i: 0.9106901731122271   total work: 7118388.0 wasted work: 1.0

43   i: 15.0 l_i: 4.0 p_i: 18.0 al_i: 42.0   sol_a_i: 46.0 sol_g_i: 0.4444444444444444 d_i: 64.0 sol_taoi: 46.0   sol_deltai: 66.0 sol_deltai - sol_taoi: 20.0 sol_taoP: 46.0 sol_deltaP: 56.0   sol_deltaP - sol_taoP: 10.0 cl_i: 5113142.0   sol_c_i: 6327456.0 sol_gp_i: 0.5757356511052784   total work: 6327456.0   wasted work: 0.0

```
44 Time: 250.000000
45
46
47
48
```