```
"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=30884

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_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_ExtendedByMe.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 ECCG

      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
      Deterministic Sub problem Status=  2 , is Optimal
      Master protblem status =  2 , is Optimal
      lb =  990.0                  ub =  990.0
       MPObj =  990.0     MP_delete_Hua_Obj =  556.0       Hua =  434.0       SPObj =  528.0       Deter_SP_Obj =  434.0

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: 0.0  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: 5.0   sol_deltaP - sol_taoP: 4.0   cl_i: 2917497.0     sol_c_i: 2917497.0    sol_gp_i: 0.0  total work: 3163728.0    wasted work: 0.9339526027521962
    i: 1.0  l_i: 6.0   p_i: 6.0  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: 12.0   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: 3031906.0    wasted work: 0.04258773194155756
    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: 7.0  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: 20.0    sol_deltaP - sol_taoP: 5.0   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: 0.0  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: 19.0    sol_deltaP - sol_taoP: 3.0   cl_i: 1727656.0     sol_c_i: 1727656.0    sol_gp_i: 0.0  total work: 1845508.0    wasted work: 0.4470118796558996
    i: 6.0  l_i: 6.0   p_i: 12.0   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: 3295550.0    wasted work: 0.5723096296521066
    i: 7.0  l_i: 7.0   p_i: 18.0   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: 25.0   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: 7.0  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: 40.0    sol_deltaP - sol_taoP: 5.0   cl_i: 4319864.0     sol_c_i: 5141058.0    sol_gp_i: 0.7786958929465492    total work: 5404702.0    wasted work: 1.0
    i: 11.0   l_i: 6.0   p_i: 18.0   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: 43.0    sol_deltaP - sol_taoP: 3.0   cl_i: 3993564.0     sol_c_i: 4481948.0    sol_gp_i: 0.26463391109656526  total work: 4613770.0    wasted work: 0.5
    i: 12.0   l_i: 6.0   p_i: 12.0   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: 42.0    sol_deltaP - sol_taoP: 3.0   cl_i: 2342507.0     sol_c_i: 2504618.0    sol_gp_i: 0.3074429913064587  total work: 2504618.0    wasted work: 0.0
    i: 13.0   l_i: 7.0   p_i: 0.0  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: 55.0    sol_deltaP - sol_taoP: 5.0   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: 4745592.0    wasted work: 1.0
Time: 193.000000
```