```
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=30564

import sys; print('Python %s on %s' % (sys.version, sys.platform))
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'])

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 _□□□□1/4 □□□□/3 python_code/9 Code for this paper/main_RO_BDC.py', wdir='E:/1 □□□□/3 □□□□□/1 □□□□□□/1 □□□□□□□□/1_□□□□□□□_□□□□/1_LW _□□□□1/4 □□□□/3 python_code/9 Code for this paper')
Backend TkAgg is interactive backend. Turning interactive mode on.
Waiting 5s.....

Optimize the  ./R_18_1.xlsx  instance by BDC

        Master protblem status =  2 , is Optimal
        sol_MP_obj =  992.0
The initial lb =  -inf        ub =  inf

The current iteration cnt =  0
        Dual problem status =  2 , is Optimal
        Add optimal cut
        Master protblem status =  2 , is Optimal
        Deterministic Sub problem Status=  2 , is Optimal
        lb =  1029.128941670356                 ub =  1029.128941670356
        MPObj =  1029.1289416703557        MPObj_Remove_Hua =  1019.0        DualSPObj =  10.128941670355886      Hua =  10.128941670355887      Deterministic_SP_SPObj =  846.0

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: 6.0  sol_a_i: 6.0  sol_g_i: 0.0  d_i: 19.0  sol_taoi: 6.0  sol_deltai: 21.0  sol_deltai - sol_taoi: 15.0  sol_taoP: 6.0  sol_deltaP: 10.0  sol_deltaP - sol_taoP: 4.0  cl_i: 3936269.0  sol_c_i: 3936269.0  sol_gp_i: 0.0  total work: 3954660.0  wasted work: 0.06975694497124911
    i: 1.0  l_i: 4.0  p_i: 11.0  al_i: 25.0  sol_a_i: 25.0  sol_g_i: 0.0  d_i: 41.0  sol_taoi: 25.0  sol_deltai: 44.0  sol_deltai - sol_taoi: 19.0  sol_taoP: 25.0  sol_deltaP: 29.0  sol_deltaP - sol_taoP: 4.0  cl_i: 4808679.0  sol_c_i: 4808679.0  sol_gp_i: 0.0  total work: 4877414.0  wasted work: 0.2607114138762877
    i: 2.0  l_i: 5.0  p_i: 10.0  al_i: 56.0  sol_a_i: 56.0  sol_g_i: 0.0  d_i: 77.0  sol_taoi: 56.0  sol_deltai: 81.0  sol_deltai - sol_taoi: 25.0  sol_taoP: 56.0  sol_deltaP: 65.0  sol_deltaP - sol_taoP: 9.0  cl_i: 6567617.0  sol_c_i: 6567617.0  sol_gp_i: 0.0  total work: 6591100.0  wasted work: 0.08907086829209085
    i: 3.0  l_i: 4.0  p_i: -0.0  al_i: 44.0  sol_a_i: 44.0  sol_g_i: 0.0  d_i: 66.0  sol_taoi: 44.0  sol_deltai: 70.0  sol_deltai - sol_taoi: 26.0  sol_taoP: 44.0  sol_deltaP: 53.0  sol_deltaP - sol_taoP: 9.0  cl_i: 6649403.0  sol_c_i: 6649403.0  sol_gp_i: 0.0  total work: 7118388.0  wasted work: 1.778857095173795
    i: 4.0  l_i: 6.0  p_i: 4.0  al_i: 60.0  sol_a_i: 60.0  sol_g_i: 0.0  d_i: 61.0  sol_taoi: 60.0  sol_deltai: 62.0  sol_deltai - sol_taoi: 2.0  sol_taoP: 60.0  sol_deltaP: 61.0  sol_deltaP - sol_taoP: 1.0  cl_i: 339223.0  sol_c_i: 339223.0  sol_gp_i: 0.0  total work: 527288.0  wasted work: 0.71332933804676
    i: 5.0  l_i: 4.0  p_i: 24.0  al_i: 42.0  sol_a_i: 42.0  sol_g_i: 0.0  d_i: 54.0  sol_taoi: 42.0  sol_deltai: 56.0  sol_deltai - sol_taoi: 14.0  sol_taoP: 42.0  sol_deltaP: 47.0  sol_deltaP - sol_taoP: 5.0  cl_i: 3511961.0  sol_c_i: 3511961.0  sol_gp_i: 0.0  total work: 3559194.0  wasted work: 0.17915446587064374
    i: 6.0  l_i: 5.0  p_i: 29.0  al_i: 16.0  sol_a_i: 16.0  sol_g_i: 0.0  d_i: 35.0  sol_taoi: 16.0  sol_deltai: 38.0  sol_deltai - sol_taoi: 22.0  sol_taoP: 16.0  sol_deltaP: 21.0  sol_deltaP - sol_taoP: 5.0  cl_i: 5705651.0  sol_c_i: 5705651.0  sol_gp_i: 0.0  total work: 6063812.0  wasted work: 1.3585023744139826
    i: 7.0  l_i: 5.0  p_i: 5.0  al_i: 56.0  sol_a_i: 56.0  sol_g_i: 0.0  d_i: 58.0  sol_taoi: 56.0  sol_deltai: 59.0  sol_deltai - sol_taoi: 3.0  sol_taoP: 56.0  sol_deltaP: 58.0  sol_deltaP - sol_taoP: 2.0  cl_i: 557774.0  sol_c_i: 557774.0  sol_gp_i: 0.0  total work: 790932.0  wasted work: 0.8843667976513784
    i: 8.0  l_i: 5.0  p_i: 19.0  al_i: 56.0  sol_a_i: 56.0  sol_g_i: 0.0  d_i: 77.0  sol_taoi: 56.0  sol_deltai: 81.0  sol_deltai - sol_taoi: 25.0  sol_taoP: 56.0  sol_deltaP: 63.0  sol_deltaP - sol_taoP: 7.0  cl_i: 6352406.0  sol_c_i: 6352406.0  sol_gp_i: 0.0  total work: 6459278.0  wasted work: 0.4053648101227413
    i: 9.0  l_i: 5.0  p_i: 29.0  al_i: 40.0  sol_a_i: 40.0  sol_g_i: 0.0  d_i: 52.0  sol_taoi: 40.0  sol_deltai: 54.0  sol_deltai - sol_taoi: 14.0  sol_taoP: 40.0  sol_deltaP: 43.0  sol_deltaP - sol_taoP: 3.0  cl_i: 3432575.0  sol_c_i: 3432575.0  sol_gp_i: 0.0  total work: 3559194.0  wasted work: 0.48026505439152795
    i: 10.0  l_i: 4.0  p_i: 15.0  al_i: 50.0  sol_a_i: 50.0  sol_g_i: 0.0  d_i: 70.0  sol_taoi: 50.0  sol_deltai: 73.0  sol_deltai - sol_taoi: 23.0  sol_taoP: 50.0  sol_deltaP: 55.0  sol_deltaP - sol_taoP: 5.0  cl_i: 5803649.0  sol_c_i: 5803649.0  sol_gp_i: 0.0  total work: 5931990.0  wasted work: 0.48679658934017084
    i: 11.0  l_i: 6.0  p_i: -0.0  al_i: 28.0  sol_a_i: 29.0  sol_g_i: 0.2  d_i: 42.0  sol_taoi: 29.0  sol_deltai: 43.0  sol_deltai - sol_taoi: 14.0  sol_taoP: 29.0  sol_deltaP: 37.0  sol_deltaP - sol_taoP: 8.0  cl_i: 3570542.0  sol_c_i: 3570542.0  sol_gp_i: 0.0  total work: 3691016.0  wasted work: 0.4569571088285719
    i: 12.0  l_i: 5.0  p_i: 4.0  al_i: 53.0  sol_a_i: 61.0  sol_g_i: 1.0  d_i: 65.0  sol_taoi: 63.0  sol_deltai: 76.0  sol_deltai - sol_taoi: 13.0  sol_taoP: 63.0  sol_deltaP: 70.0  sol_deltaP - sol_taoP: 7.0  cl_i: 3418286.0  sol_c_i: 5263794.0  sol_gp_i: 1.0  total work: 5272880.0  wasted work: 0.034463139688367644
    i: 13.0  l_i: 4.0  p_i: 30.0  al_i: 59.0  sol_a_i: 65.0  sol_g_i: 0.6  d_i: 65.0  sol_taoi: 65.0  sol_deltai: 70.0  sol_deltai - sol_taoi: 5.0  sol_taoP: 65.0  sol_deltaP: 66.0  sol_deltaP - sol_taoP: 1.0  cl_i: 1067915.0  sol_c_i: 1067915.0  sol_gp_i: 0.0  total work: 1318220.0  wasted work: 0.9494052586063024
    i: 14.0  l_i: 6.0  p_i: 21.0  al_i: 29.0  sol_a_i: 33.2  sol_g_i: 0.6  d_i: 39.0  sol_taoi: 34.0  sol_deltai: 41.0  sol_deltai - sol_taoi: 7.0  sol_taoP: 34.0  sol_deltaP: 36.0  sol_deltaP - sol_taoP: 2.0  cl_i: 1739820.0  sol_c_i: 1739820.0  sol_gp_i: 0.0  total work: 2109152.0  wasted work: 1.4008739057213515
    i: 15.0  l_i: 6.0  p_i: 28.0  al_i: 56.0  sol_a_i: 56.0  sol_g_i: 0.0  d_i: 62.0  sol_taoi: 56.0  sol_deltai: 64.0  sol_deltai - sol_taoi: 8.0  sol_taoP: 56.0  sol_deltaP: 60.0  sol_deltaP - sol_taoP: 4.0  cl_i: 2100599.0  sol_c_i: 4209751.0  sol_gp_i: 1.0  total work: 4481948.0  wasted work: 1.0324414741090258
    i: 16.0  l_i: 5.0  p_i: 6.0  al_i: 21.0  sol_a_i: 27.0  sol_g_i: 1.0  d_i: 38.0  sol_taoi: 27.0  sol_deltai: 44.0  sol_deltai - sol_taoi: 17.0  sol_taoP: 27.0  sol_deltaP: 35.0  sol_deltaP - sol_taoP: 8.0  cl_i: 4470957.0  sol_c_i: 5789177.0  sol_gp_i: 1.0  total work: 5800168.0  wasted work: 0.
```

```
04168879246256316
      i: 17.0    l_i: 4.0    p_i: 17.0    aI_i: 26.0       sol_a_i: 31.4  sol_g_i: 0.6    d_i: 42.0    sol_taoi: 32.0     sol_deltai: 42.0  sol_deltai - sol_taoi: 10.0
   sol_taoP: 32.0    sol_deltaP: 37.0    sol_deltaP - sol_taoP: 5.0  cI_i: 2423424.0    sol_c_i: 4532576.0    sol_gp_i: 1.0  total work: 4745592.0    wasted work
   : 0.807968320917601

Optimal objective = 1865.0

Time: 627.000000
```