```
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=31897

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_16_4.xlsx  instance by BDC

        Master protblem status =  2 , is Optimal
        sol_MP_obj =  791.0
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 =  832.6428360657184                 ub =  832.6428360657184
        MPObj =  832.6428360657184      MPObj_Remove_Hua =  823.0       DualSPObj =  9.642836065718381        Hua =  9.642836065718381        Deterministic_SP_SPObj =  654.0

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: 4.0  p_i: 20.0  al_i: 25.0  sol_a_i: 25.0  sol_g_i: 0.0  d_i: 38.0  sol_taoi: 25.0  sol_deltai: 38.0  sol_deltai - sol_taoi: 13.0  sol_taoP: 25.0  sol_deltaP: 29.0  sol_deltaP - sol_taoP: 4.0  cl_i: 3171685.0  sol_c_i: 3171685.0  sol_gp_i: 0.0  total work: 3295550.0  wasted work: 0.4698191500659981
    i: 1.0  l_i: 4.0  p_i: 30.0  al_i: 46.0  sol_a_i: 46.0  sol_g_i: 0.0  d_i: 63.0  sol_taoi: 46.0  sol_deltai: 63.0  sol_deltai - sol_taoi: 17.0  sol_taoP: 46.0  sol_deltaP: 51.0  sol_deltaP - sol_taoP: 5.0  cl_i: 4356745.0  sol_c_i: 4356745.0  sol_gp_i: 0.0  total work: 4613770.0  wasted work: 0.9748941754790551
    i: 2.0  l_i: 5.0  p_i: 28.0  al_i: 18.0  sol_a_i: 18.0  sol_g_i: 0.0  d_i: 27.0  sol_taoi: 18.0  sol_deltai: 27.0  sol_deltai - sol_taoi: 9.0  sol_taoP: 18.0  sol_deltaP: 21.0  sol_deltaP - sol_taoP: 3.0  cl_i: 2167120.0  sol_c_i: 2167120.0  sol_gp_i: 0.0  total work: 2372796.0  wasted work: 0.7801277480238503
    i: 3.0  l_i: 6.0  p_i: 28.0  al_i: 28.0  sol_a_i: 28.0  sol_g_i: 0.0  d_i: 37.0  sol_taoi: 28.0  sol_deltai: 37.0  sol_deltai - sol_taoi: 9.0  sol_taoP: 28.0  sol_deltaP: 31.0  sol_deltaP - sol_taoP: 3.0  cl_i: 2226140.0  sol_c_i: 2226140.0  sol_gp_i: 0.0  total work: 2240974.0  wasted work: 0.05626526679916857
    i: 4.0  l_i: 7.0  p_i: 7.0  al_i: 19.0  sol_a_i: 19.0  sol_g_i: 0.0  d_i: 43.0  sol_taoi: 19.0  sol_deltai: 43.0  sol_deltai - sol_taoi: 24.0  sol_taoP: 19.0  sol_deltaP: 30.0  sol_deltaP - sol_taoP: 11.0  cl_i: 6133379.0  sol_c_i: 6133379.0  sol_gp_i: 0.0  total work: 6195634.0  wasted work: 0.23613281546327625
    i: 5.0  l_i: 5.0  p_i: 11.0  al_i: 54.0  sol_a_i: 54.0  sol_g_i: 0.0  d_i: 67.0  sol_taoi: 54.0  sol_deltai: 67.0  sol_deltai - sol_taoi: 13.0  sol_taoP: 54.0  sol_deltaP: 58.0  sol_deltaP - sol_taoP: 4.0  cl_i: 3260541.0  sol_c_i: 3260541.0  sol_gp_i: 0.0  total work: 3295550.0  wasted work: 0.13278891232116036
    i: 6.0  l_i: 4.0  p_i: 0.0  al_i: 65.0  sol_a_i: 65.0  sol_g_i: 0.0  d_i: 83.0  sol_taoi: 65.0  sol_deltai: 85.0  sol_deltai - sol_taoi: 20.0  sol_taoP: 65.0  sol_deltaP: 75.0  sol_deltaP - sol_taoP: 10.0  cl_i: 5186033.0  sol_c_i: 5186033.0  sol_gp_i: 0.0  total work: 5272880.0  wasted work: 0.3294101136380877
    i: 7.0  l_i: 5.0  p_i: -0.0  al_i: 12.0  sol_a_i: 12.0  sol_g_i: 0.0  d_i: 21.0  sol_taoi: 12.0  sol_deltai: 21.0  sol_deltai - sol_taoi: 9.0  sol_taoP: 12.0  sol_deltaP: 15.0  sol_deltaP - sol_taoP: 3.0  cl_i: 2265314.0  sol_c_i: 2265314.0  sol_gp_i: 0.0  total work: 2372796.0  wasted work: 0.4076785362079167
    i: 8.0  l_i: 5.0  p_i: 24.0  al_i: 38.0  sol_a_i: 38.0  sol_g_i: 0.0  d_i: 49.0  sol_taoi: 38.0  sol_deltai: 49.0  sol_deltai - sol_taoi: 11.0  sol_taoP: 38.0  sol_deltaP: 40.0  sol_deltaP - sol_taoP: 2.0  cl_i: 2738944.0  sol_c_i: 2738944.0  sol_gp_i: 0.0  total work: 3031906.0  wasted work: 1.111202985844548
    i: 9.0  l_i: 4.0  p_i: -0.0  al_i: 18.0  sol_a_i: 22.0  sol_g_i: 0.8  d_i: 40.0  sol_taoi: 22.0  sol_deltai: 43.0  sol_deltai - sol_taoi: 21.0  sol_taoP: 22.0  sol_deltaP: 33.0  sol_deltaP - sol_taoP: 11.0  cl_i: 5299771.0  sol_c_i: 6565262.2  sol_gp_i: 0.8  total work: 6591100.0  wasted work: 0.09800260957958389
    i: 10.0  l_i: 6.0  p_i: 14.0  al_i: 17.0  sol_a_i: 20.2  sol_g_i: 0.4  d_i: 43.0  sol_taoi: 21.0  sol_deltai: 42.0  sol_deltai - sol_taoi: 21.0  sol_taoP: 21.0  sol_deltaP: 27.0  sol_deltaP - sol_taoP: 6.0  cl_i: 5337655.0  sol_c_i: 5337655.0  sol_gp_i: 0.0  total work: 5404702.0  wasted work: 0.25430884070944154
    i: 11.0  l_i: 7.0  p_i: 4.0  al_i: 50.0  sol_a_i: 56.0  sol_g_i: 0.6  d_i: 75.0  sol_taoi: 56.0  sol_deltai: 72.0  sol_deltai - sol_taoi: 16.0  sol_taoP: 56.0  sol_deltaP: 61.0  sol_deltaP - sol_taoP: 5.0  cl_i: 4079978.0  sol_c_i: 4290893.2  sol_gp_i: 0.2  total work: 4481948.0  wasted work: 0.7246696302589849
    i: 12.0  l_i: 4.0  p_i: 24.0  al_i: 14.0  sol_a_i: 18.2  sol_g_i: 0.6  d_i: 28.0  sol_taoi: 19.0  sol_deltai: 31.0  sol_deltai - sol_taoi: 12.0  sol_taoP: 19.0  sol_deltaP: 24.0  sol_deltaP - sol_taoP: 5.0  cl_i: 3077210.0  sol_c_i: 4922718.0  sol_gp_i: 1.0  total work: 5141058.0  wasted work: 0.8281622187495259
    i: 13.0  l_i: 4.0  p_i: 11.0  al_i: 65.0  sol_a_i: 69.2  sol_g_i: 0.6  d_i: 83.0  sol_taoi: 70.0  sol_deltai: 94.0  sol_deltai - sol_taoi: 24.0  sol_taoP: 70.0  sol_deltaP: 75.0  sol_deltaP - sol_taoP: 5.0  cl_i: 6195972.0  sol_c_i: 6195972.0  sol_gp_i: 0.0  total work: 6327456.0  wasted work: 0.49871796816919783
    i: 14.0  l_i: 6.0  p_i: 16.0  al_i: 61.0  sol_a_i: 64.6  sol_g_i: 0.6  d_i: 83.0  sol_taoi: 65.0  sol_deltai: 89.0  sol_deltai - sol_taoi: 24.0  sol_taoP: 65.0  sol_deltaP: 70.0  sol_deltaP - sol_taoP: 5.0  cl_i: 6094147.0  sol_c_i: 7412367.0  sol_gp_i: 1.0  total work: 7513854.0  wasted work: 0.3849395396822989
    i: 15.0  l_i: 4.0  p_i: 20.0  al_i: 6.0  sol_a_i: 9.6  sol_g_i: 0.4  d_i: 26.0  sol_taoi: 10.0  sol_deltai: 22.0  sol_deltai - sol_taoi: 12.0  sol_taoP: 10.0  sol_deltaP: 14.0  sol_deltaP - sol_taoP: 4.0  cl_i: 3009208.0  sol_c_i: 5118360.0  sol_gp_i: 1.0  total work: 5272880.0  wasted work: 0.5860933683300208

Optimal objective =  1477.0
```

```
48
49  Time: 1166.000000
50
51
52
53
```