```
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=57876

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_15_3.xlsx  instance by BDC

        Master protblem status =  2 , is Optimal
        sol_MP_obj =  547.0
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 =  583.9116170863651                 ub =  583.9116170863651
        MPObj =  583.9116170863651      MPObj_Remove_Hua =  579.0       DualSPObj =  4.911617086365151        Hua =  4.911617086365151        Deterministic_SP_SPObj =  470.0

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: 5.0    p_i: 0.0    aI_i: 3.0       sol_a_i: 3.0    sol_g_i: 0.0    d_i: 39.0    sol_taoi: 3.0    sol_deltai: 7.0    sol_deltai - sol_taoi: 4.0    sol_taoP: 3.0    sol_deltaP: 4.0    sol_deltaP - sol_taoP: 1.0    cI_i: 1002244.0     sol_c_i: 1002244.0    sol_gp_i: 0.0  total work: 1054576.0    wasted work: 0.19849494014656127
    i: 1.0  l_i: 5.0    p_i: 15.0    aI_i: 8.0       sol_a_i: 8.0    sol_g_i: 0.0    d_i: 54.0    sol_taoi: 8.0    sol_deltai: 23.0    sol_deltai - sol_taoi: 15.0    sol_taoP: 8.0    sol_deltaP: 11.0    sol_deltaP - sol_taoP: 3.0    cI_i: 3867170.0     sol_c_i: 3867170.0    sol_gp_i: 0.0  total work: 4745592.0    wasted work: 3.331849008511478
    i: 2.0  l_i: 5.0    p_i: 10.0    aI_i: 13.0      sol_a_i: 13.0    sol_g_i: 0.0    d_i: 55.0    sol_taoi: 13.0    sol_deltai: 24.0    sol_deltai - sol_taoi: 11.0    sol_taoP: 13.0    sol_deltaP: 15.0    sol_deltaP - sol_taoP: 2.0    cI_i: 2793468.0     sol_c_i: 2793468.0    sol_gp_i: 0.0  total work: 2900084.0    wasted work: 0.404393803765684
    i: 3.0  l_i: 5.0    p_i: 5.0    aI_i: 17.0      sol_a_i: 17.0    sol_g_i: 0.0    d_i: 62.0    sol_taoi: 17.0    sol_deltai: 31.0    sol_deltai - sol_taoi: 14.0    sol_taoP: 17.0    sol_deltaP: 21.0    sol_deltaP - sol_taoP: 4.0    cI_i: 3514829.0     sol_c_i: 3514829.0    sol_gp_i: 0.0  total work: 3691016.0    wasted work: 0.6682761602767369
    i: 4.0  l_i: 5.0    p_i: 20.0    aI_i: 19.0      sol_a_i: 19.0    sol_g_i: 0.0    d_i: 55.0    sol_taoi: 19.0    sol_deltai: 24.0    sol_deltai - sol_taoi: 5.0    sol_taoP: 19.0    sol_deltaP: 20.0    sol_deltaP - sol_taoP: 1.0    cI_i: 1292682.0     sol_c_i: 1292682.0    sol_gp_i: 0.0  total work: 1450042.0    wasted work: 0.5968654701036246
    i: 5.0  l_i: 5.0    p_i: 0.0    aI_i: 22.0      sol_a_i: 22.0    sol_g_i: 0.0    d_i: 57.0    sol_taoi: 22.0    sol_deltai: 26.0    sol_deltai - sol_taoi: 4.0    sol_taoP: 22.0    sol_deltaP: 23.0    sol_deltaP - sol_taoP: 1.0    cI_i: 1037494.0     sol_c_i: 1037494.0    sol_gp_i: 0.0  total work: 1054576.0    wasted work: 0.0647919163720775
    i: 6.0  l_i: 5.0    p_i: 10.0    aI_i: 26.0      sol_a_i: 26.0    sol_g_i: 0.0    d_i: 62.0    sol_taoi: 26.0    sol_deltai: 33.0    sol_deltai - sol_taoi: 7.0    sol_taoP: 26.0    sol_deltaP: 28.0    sol_deltaP - sol_taoP: 2.0    cI_i: 1812852.0     sol_c_i: 1812852.0    sol_gp_i: 0.0  total work: 1845508.0    wasted work: 0.12386399842211467
    i: 7.0  l_i: 5.0    p_i: 20.0    aI_i: 29.0      sol_a_i: 29.0    sol_g_i: 0.0    d_i: 82.0    sol_taoi: 29.0    sol_deltai: 41.0    sol_deltai - sol_taoi: 12.0    sol_taoP: 29.0    sol_deltaP: 31.0    sol_deltaP - sol_taoP: 2.0    cI_i: 2983420.0     sol_c_i: 2983420.0    sol_gp_i: 0.0  total work: 3163728.0    wasted work: 0.6839070868292091
    i: 8.0  l_i: 5.0    p_i: 15.0    aI_i: 31.0      sol_a_i: 35.0    sol_g_i: 0.8    d_i: 73.0    sol_taoi: 35.0    sol_deltai: 46.0    sol_deltai - sol_taoi: 11.0    sol_taoP: 35.0    sol_deltaP: 38.0    sol_deltaP - sol_taoP: 3.0    cI_i: 2870420.0     sol_c_i: 3186792.8    sol_gp_i: 0.2  total work: 3295550.0    wasted work: 0.4125153616240088
    i: 9.0  l_i: 5.0    p_i: 25.0    aI_i: 32.0      sol_a_i: 32.0    sol_g_i: 0.0    d_i: 77.0    sol_taoi: 32.0    sol_deltai: 40.0    sol_deltai - sol_taoi: 8.0    sol_taoP: 32.0    sol_deltaP: 34.0    sol_deltaP - sol_taoP: 2.0    cI_i: 1873374.0     sol_c_i: 2927950.0    sol_gp_i: 1.0  total work: 3163728.0    wasted work: 0.8943044408368861
    i: 10.0  l_i: 5.0    p_i: 5.0    aI_i: 36.0      sol_a_i: 46.0    sol_g_i: 1.0    d_i: 82.0    sol_taoi: 46.0    sol_deltai: 62.0    sol_deltai - sol_taoi: 16.0    sol_taoP: 46.0    sol_deltaP: 50.0    sol_deltaP - sol_taoP: 4.0    cI_i: 4119901.0     sol_c_i: 4119901.0    sol_gp_i: 0.0  total work: 4218304.0    wasted work: 0.37324194747462486
    i: 11.0  l_i: 5.0    p_i: 10.0    aI_i: 38.0      sol_a_i: 42.2    sol_g_i: 0.6    d_i: 74.0    sol_taoi: 43.0    sol_deltai: 54.0    sol_deltai - sol_taoi: 11.0    sol_taoP: 43.0    sol_deltaP: 46.0    sol_deltaP - sol_taoP: 3.0    cI_i: 2878192.0     sol_c_i: 4723700.0    sol_gp_i: 1.0  total work: 4745592.0    wasted work: 0.08303621550272337
    i: 12.0  l_i: 5.0    p_i: 0.0    aI_i: 42.0      sol_a_i: 42.0    sol_g_i: 0.0    d_i: 80.0    sol_taoi: 42.0    sol_deltai: 55.0    sol_deltai - sol_taoi: 13.0    sol_taoP: 42.0    sol_deltaP: 46.0    sol_deltaP - sol_taoP: 4.0    cI_i: 3205861.0     sol_c_i: 3205861.0    sol_gp_i: 0.0  total work: 3427372.0    wasted work: 0.840189801398856
    i: 13.0  l_i: 5.0    p_i: 20.0    aI_i: 46.0      sol_a_i: 49.6    sol_g_i: 0.6    d_i: 76.0    sol_taoi: 50.0    sol_deltai: 57.0    sol_deltai - sol_taoi: 7.0    sol_taoP: 50.0    sol_deltaP: 52.0    sol_deltaP - sol_taoP: 2.0    cI_i: 1842456.0     sol_c_i: 2897032.0    sol_gp_i: 0.8  total work: 3163728.0    wasted work: 1.0115762164130417
    i: 14.0  l_i: 5.0    p_i: 15.0    aI_i: 38.0      sol_a_i: 47.0    sol_g_i: 1.0    d_i: 79.0    sol_taoi: 47.0    sol_deltai: 56.0    sol_deltai - sol_taoi: 9.0    sol_taoP: 47.0    sol_deltaP: 51.0    sol_deltaP - sol_taoP: 4.0    cI_i: 2171089.0     sol_c_i: 4280241.0    sol_gp_i: 1.0  total work: 4481948.0    wasted work: 0.7650733564958808

Optimal objective =  1049.0

Time: 174.000000
```

50
51
52