

```

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=32704
2
3 import sys; print('Python %s on %s' % (sys.version, sys.platform))
4 sys.path.extend(['E:\\1 \\3 \\ \\1 \\ \\ \\ \\1 \\ \\ \\ \\ \\1 \\ \\ \\ \\ \\1 \\_ \\ \\ \\1 \\4 \\ \\ \\ \\3 python_code\\9 Code for this
paper', 'E:/1 \\ \\ \\3 \\ \\ \\ \\1 \\ \\ \\ \\ \\1 \\ \\ \\ \\ \\1 \\_ \\ \\ \\ \\1 \\_ \\ \\ \\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 \\_ \\ \\ \\1/4 \\ \\ \\ \\3 python_code/9 Code for this paper/
main_RO_BDC.py', wdir='E:/1 \\ \\ \\3 \\ \\ \\ \\1 \\ \\ \\ \\ \\1 \\ \\ \\ \\ \\1 \\_ \\ \\ \\ \\1 \\_ \\ \\ \\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 BDC
14
15 Master problem status = 2 , is Optimal
16 sol_MP_obj = 700.0
17 The initial lb = -inf ub = inf
18
19 The current iteration cnt = 0
20 Dual problem status = 2 , is Optimal
21 Add optimal cut
22 Master problem status = 2 , is Optimal
23 Deterministic Sub problem Status= 2 , is Optimal
24 lb = 739.1422144481523 ub = 739.1422144481523
25 MPObj = 739.1422144481523 MPObj_Remove_Hua = 728.0 DualSPObj = 11.142214448152323 Hua = 11.142214448152322
Deterministic_SP_SPObj = 538.0
26
27 ub - lb = 0.0
28
29 Iteration cycle stopped by termination criterion 1: Because ub - lb <= eps, the iteration stop, and cnt = 0
30 i: 0.0 l_i: 4.0 p_i: 20.0 al_i: 21.0 sol_a_i: 21.0 sol_g_i: 0.0 d_i: 31.0 sol_taoi: 21.0 sol_delta_i: 31.0 sol_delta_i - sol_taoi: 10.0 sol_taoP
: 21.0 sol_deltaP: 23.0 sol_deltaP - sol_taoP: 2.0 cl_i: 2564346.0 sol_c_i: 2564346.0 sol_gp_i: 0.0 total work: 2636440.0 wasted work: 0.
2734520793190818
31 i: 1.0 l_i: 4.0 p_i: 7.0 al_i: 37.0 sol_a_i: 37.0 sol_g_i: 0.0 d_i: 50.0 sol_taoi: 37.0 sol_delta_i: 50.0 sol_delta_i - sol_taoi: 13.0 sol_taoP:
37.0 sol_deltaP: 43.0 sol_deltaP - sol_taoP: 6.0 cl_i: 3378522.0 sol_c_i: 3378522.0 sol_gp_i: 0.0 total work: 3427372.0 wasted work: 0.
18528773649314986
32 i: 2.0 l_i: 6.0 p_i: 28.0 al_i: 47.0 sol_a_i: 47.0 sol_g_i: 0.0 d_i: 62.0 sol_taoi: 47.0 sol_delta_i: 62.0 sol_delta_i - sol_taoi: 15.0 sol_taoP
: 47.0 sol_deltaP: 51.0 sol_deltaP - sol_taoP: 4.0 cl_i: 3846651.0 sol_c_i: 3846651.0 sol_gp_i: 0.0 total work: 4086482.0 wasted work: 0.
9096774438257651
33 i: 3.0 l_i: 6.0 p_i: 18.0 al_i: 1.0 sol_a_i: 1.0 sol_g_i: 0.0 d_i: 18.0 sol_taoi: 1.0 sol_delta_i: 18.0 sol_delta_i - sol_taoi: 17.0 sol_taoP: 1
.0 sol_deltaP: 6.0 sol_deltaP - sol_taoP: 5.0 cl_i: 4246384.0 sol_c_i: 4246384.0 sol_gp_i: 0.0 total work: 4613770.0 wasted work: 1.
3934927402102835
34 i: 4.0 l_i: 4.0 p_i: 30.0 al_i: 11.0 sol_a_i: 11.0 sol_g_i: 0.0 d_i: 36.0 sol_taoi: 11.0 sol_delta_i: 36.0 sol_delta_i - sol_taoi: 25.0 sol_taoP
: 11.0 sol_deltaP: 16.0 sol_deltaP - sol_taoP: 5.0 cl_i: 6440269.0 sol_c_i: 6440269.0 sol_gp_i: 0.0 total work: 6591100.0 wasted work: 0.
5721010150050826
35 i: 5.0 l_i: 6.0 p_i: 12.0 al_i: 2.0 sol_a_i: 2.0 sol_g_i: 0.0 d_i: 19.0 sol_taoi: 2.0 sol_delta_i: 19.0 sol_delta_i - sol_taoi: 17.0 sol_taoP: 2
.0 sol_deltaP: 7.0 sol_deltaP - sol_taoP: 5.0 cl_i: 4398544.0 sol_c_i: 4398544.0 sol_gp_i: 0.0 total work: 4481948.0 wasted work: 0.
31635083673438424
36 i: 6.0 l_i: 7.0 p_i: 4.0 al_i: 64.0 sol_a_i: 64.0 sol_g_i: 0.0 d_i: 82.0 sol_taoi: 64.0 sol_delta_i: 82.0 sol_delta_i - sol_taoi: 18.0 sol_taoP:
64.0 sol_deltaP: 69.0 sol_deltaP - sol_taoP: 5.0 cl_i: 4627375.0 sol_c_i: 4627375.0 sol_gp_i: 0.0 total work: 5009236.0 wasted work: 1.
4483963223134226
37 i: 7.0 l_i: 7.0 p_i: -0.0 al_i: 37.0 sol_a_i: 37.0 sol_g_i: 0.0 d_i: 45.0 sol_taoi: 37.0 sol_delta_i: 45.0 sol_delta_i - 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: 2109152.0 wasted work: 0.
16844684498793827
38 i: 8.0 l_i: 5.0 p_i: 7.0 al_i: 8.0 sol_a_i: 8.0 sol_g_i: 0.0 d_i: 27.0 sol_taoi: 8.0 sol_delta_i: 27.0 sol_delta_i - 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
39 i: 9.0 l_i: 7.0 p_i: -0.0 al_i: 4.0 sol_a_i: 4.0 sol_g_i: 0.0 d_i: 31.0 sol_taoi: 4.0 sol_delta_i: 28.0 sol_delta_i - sol_taoi: 24.0 sol_taoP: 4
.0 sol_deltaP: 11.0 sol_deltaP - sol_taoP: 7.0 cl_i: 6090104.0 sol_c_i: 7355595.2 sol_gp_i: 0.8 total work: 7382032.0 wasted work: 0.
10027461273535454
40 i: 10.0 l_i: 5.0 p_i: 23.0 al_i: 48.0 sol_a_i: 54.4 sol_g_i: 0.8 d_i: 69.0 sol_taoi: 55.0 sol_delta_i: 75.0 sol_delta_i - sol_taoi: 20.0
sol_taoP: 55.0 sol_deltaP: 61.0 sol_deltaP - sol_taoP: 6.0 cl_i: 5195384.0 sol_c_i: 5195384.0 sol_gp_i: 0.0 total work: 5404702.0 wasted work
: 0.7939418306504226
41 i: 11.0 l_i: 7.0 p_i: 11.0 al_i: 27.0 sol_a_i: 37.0 sol_g_i: 1.0 d_i: 42.0 sol_taoi: 37.0 sol_delta_i: 51.0 sol_delta_i - sol_taoi: 14.0
sol_taoP: 37.0 sol_deltaP: 40.0 sol_deltaP - sol_taoP: 3.0 cl_i: 3674443.0 sol_c_i: 3885358.2 sol_gp_i: 0.2 total work: 3954660.0 wasted work
: 0.26286128263870906
42 i: 12.0 l_i: 7.0 p_i: 12.0 al_i: 10.0 sol_a_i: 14.2 sol_g_i: 0.6 d_i: 24.0 sol_taoi: 20.0 sol_delta_i: 34.0 sol_delta_i - 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: 5295193.0 sol_gp_i: 1.0 total work: 5404702.0 wasted work
: 0.41536693419914733
43 i: 13.0 l_i: 5.0 p_i: 18.0 al_i: 37.0 sol_a_i: 41.2 sol_g_i: 0.6 d_i: 67.0 sol_taoi: 42.0 sol_delta_i: 67.0 sol_delta_i - sol_taoi: 25.0
sol_taoP: 42.0 sol_deltaP: 50.0 sol_deltaP - sol_taoP: 8.0 cl_i: 6370527.0 sol_c_i: 6370527.0 sol_gp_i: 0.0 total work: 6591100.0 wasted work
: 0.836631973418701
44 i: 14.0 l_i: 6.0 p_i: 24.0 al_i: 11.0 sol_a_i: 14.6 sol_g_i: 0.6 d_i: 34.0 sol_taoi: 15.0 sol_delta_i: 37.0 sol_delta_i - sol_taoi: 22.0
sol_taoP: 15.0 sol_deltaP: 21.0 sol_deltaP - sol_taoP: 6.0 cl_i: 5654254.0 sol_c_i: 6972474.0 sol_gp_i: 1.0 total work: 7118388.0 wasted work
: 0.5534508655611354
45 i: 15.0 l_i: 4.0 p_i: -0.0 al_i: 42.0 sol_a_i: 45.6 sol_g_i: 0.4 d_i: 64.0 sol_taoi: 46.0 sol_delta_i: 66.0 sol_delta_i - 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: 7222294.0 sol_gp_i: 1.0 total work: 7382032.0 wasted
work: 0.6058852088422266
46
47 Optimal objective = 1266.0

```

unknown

48
49 Time: 291.000000
50
51
52
53