```
1degener
 +1 :max|min (+1|-1) but degeneracy doesn't appear !
  1.5 1    c
    3  2   +32
    7 -2   +28
    0  1   +16
    3  1   +25  A|b
 0 artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest

2degenLiu
 +1 :max|min (+1|-1) Shun-Chen Niu
    2  1     c z=4 (2 0 4 ...) https://www.utdallas.edu/~scniu/...
    4  3       +12
    4  1       +8
    4  2       +8  A ...OPRE-6201/documents/LP10-Special-Situations.pdf
 0 artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest

Anstee_CYCLING
 +1 :max|min https://www.math.ubc.ca/~anstee/math340/cyclingLP.pdf
   10  -57   -9  -24     c
  0.5 -5.5 -2.5   9     +0
  0.5 -1.5 -0.5   1     +0
    1    0    0    0     +1  A   z = 1 (1 0 1 0 2 0 0)
 0  artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest

Beale
 -1 :max|min (+1|-1) Dantzig & Thapa, 1997, "LP 1: introduction", Springer,
 -0.75 150 -0.02 6    c
  0.25 -60 -0.04 9    +0
  0.5  -90 -0.02 3    +0
    0     0   1   0    +1  A
 0 artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest

Bronson1_06
+1 :max|min (+1|-1) Bronson, Prb 1.6 Multiple solutions
   7  7  6  9    c  z* = 55000 (0 0 1666.(6) 500 0 0) & (5000 0 3333.(3) 0 0)
   4  5  3  5   +30000
   2 1.5 3  3   +20000  A To get the 2.nd soln, increase c_1 (e.g., 7.001)
 0 artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest

BronsonN3_01
 +1 :max|min (+1|-1) Bronson & Naadimuthu, 2001, ISBN 972-773-067-1, p 42
   1  9  1    c  z* = 40.5 (0 4.5 0 0 6)
   1  2  3   +9
   3  2  2   +15  A
 0  artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest

BronsonN3_02
 -1 :max|min (+1|-1) Bronson & Naadimuthu, 2001, ISBN 972-773-067-1, p 44
 80   60      c z* = 71.67 (0.5833 0.4167 0 0)
 0.20 0.32   +0.25
  1    1     +1   A
 4  artificials
 1+3 :bigM
 0 :ibasgraph
```

```
 0 2 :ishow, itest
```

```
BronsonN3_07
+1 :max|min (+1|-1) Bronson & Naadimuthu, 2001, ISBN 972-773-067-1, pp 51 & 8
 4 -3 +6 -1    0  0   c z* = 125, (37.727 12.273 2.272.7 =)
 1  1  0  0    0  0  +100
 0  0  1  1    0  0  +20
 1  0  1  0    0  0  +40
 0  1  0  1    0  0  +60
 1 -10 0  0    0  0  +0
 0  0  6 -5    0  0  +0
 2 -8  0  0    0  0  +0
 0  0  2 -8    0  0  +0
 1  1  0  0   -1  0  +50
 0  0  1  1    0 -1  +5  A c_3 = 6 + eps ==> sister solution
 15 16  artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest
```

```
BronsonN5_03
 +1 :max|min (+1|-1) Bronson & Naadimuthu, 2001, ISBN 972-773-067-1, p 111
 2 3 4    0   c z* = 2 - 2M (1 0 0 0 0 1 1) Impossible (<; =; >)
 1 1 1    0  +1
 1 1 2    0  +2
 3 2 1   -1  +4  A
 6 7  artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest
```

```
BronsonN5_04
 +1 :max|min (+1|-1) Bronson & Naadimuthu, 2001, ISBN 972-773-067-1, p 113
 2 1      c z* = 5 (5 0 1 0 7)/2
 1 1     +3
 2 1     +5
 1 3     +6  A
 0  artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest
```

```
BronsonN5_05
 -1 :max|min (+1|-1) Bronson & Naadimuthu, 2001, ISBN 972-773-067-1, p 115
 1  1   0   c   z* = 5 (4 1 5 ...) (<; >; =)
 1  3   0  +12
 3  1  -1  +13
 1 -1   0  +3  A
 5 6  artificials
 1+3 :bigM
 0 :ibasgraph
 0 2 :ishow, itest
```

```
BronsonN5_06
 +1 :max|min (+1|-1) Bronson & Naadimuthu, 2001, ISBN 972-773-067-1, p 118
 7 2 3 1     c z* = 37.53 = 713/19 (0.7368 0.7895 10.26) = (14 15 195)/19
 2 7 0 0   +7
 5 8 0 2   +10
 1 0 1 0   +11  A (=; =; =)
 5 6 7  artificials
 1+2 :bigM
 0 :ibasgraph
 0 2 :ishow, itest
```

```
KleeMinty
 +1 :max|min (+1|-1) Chris Osborn http://www.cse.msu.edu/~torng/960/
 100 10  1      c  z* =  1e+4 (0 0 1e+4 0 ...)
   1  0  0     +1
  20  1  0     +100
 200 20  1     +10000  A
 0  artificials (7 iters.)
 1+3 :bigM
 0 :ibasgraph
```

```
 0 2 :ishow, itest

Kuhn_CYCLING Not used !
 +1 :max|min (+1|-1) Dantzig & Thapa, 1997, "LP 1: introduction", Springer,
   2   3  -1 -12     0 0  c z* =  (...) New York (NY). ISBN 0-387-94833-3
  -2  -9   1   9     1 0     +0
   1   3  -1  -6     1 0     +0  A "Kuhn's exa. of cycling", Prb 3.14, p 102
 0  artificials
 1+3 :bigM
 5 6 :initial basis
 0 :ibasgraph
 0 2 :ishow, itest

Zionts
+1 :max|min (+1|-1)
 0.56 0.42    c
   1  2  +240
  1.5 1  +180
   1  0  +110  A
 0  artificials
 1+3 :bigM
 0 :igraphbasis
 0 0 :ishow, itest
```