Loops with constant objective function

With the simplex method we change basis from B to B', decreasing the objective function

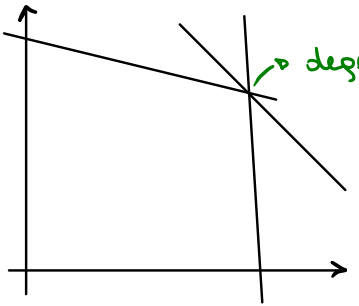
For some iterations, the change in the objective function can be 0

It can happen that we revisit the same basis, creating a loop
(in large applications, happens very often)

$$|\Delta z| = |c_h| \vartheta \qquad (\vartheta > 0) \rightarrow \min \left\{ \frac{\bar{b}_i}{\bar{a}_{ih}} : a_{ih} > 0 \right\}$$

$$|\Delta z| = 0 \iff \bar{b}_t = 0 \quad | \quad t = \operatorname{argmin} \left\{ \frac{\bar{b}_i}{\bar{a}_{ih}} : \bar{a}_{ih} > 0 \right\}$$

If $\bar{b}_t = 0$, we have a degeneracy



Removing the constraint that causes the degeneracy is not simple:
we might end up changing the polyhedron

How to avoid the loops:

- random pivots
- add random noise to the constraints
  ↳ must remove them sometime later
- Bland's rule