5.311 orth_link_ori_siz_end

Origin   Used by several constraints between orthotopes

Constraint   orth_link_ori_siz_end(ORTHOTOPE)

Argument   ORTHOTOPE : collection(ori−dvar, siz−dvar, end−dvar)

Restrictions |ORTHOTOPE| > 0
                    require_at_least(2, ORTHOTOPE, [ori, siz, end])
                    ORTHOTOPE.siz ≥ 0
                    ORTHOTOPE.ori ≤ ORTHOTOPE.end

Purpose   Enforce for each item of the ORTHOTOPE collection the constraint ori + siz = end.

Example $(\langle \text{ori} - 2 \, \text{siz} - 2 \, \text{end} - 4, \text{ori} - 1 \, \text{siz} - 3 \, \text{end} - 4 \rangle)$

The orth_link_ori_siz_end constraint holds since the two items $\langle \text{ori} - 2 \, \text{siz} - 2 \, \text{end} - 4 \rangle$ and $\langle \text{ori} - 1 \, \text{siz} - 3 \, \text{end} - 4 \rangle$ respectively verify the conditions $2 + 2 = 4$ and $1 + 3 = 4$.

Typical |ORTHOTOPE| > 1
                    ORTHOTOPE.siz > 0

Symmetries
- Items of ORTHOTOPE are permutable.
- One and the same constant can be added to the ori and end attributes of all items of ORTHOTOPE.
- One and the same constant can be added to the siz and end attributes of all items of ORTHOTOPE.

Arg. properties
- Functional dependency: ORTHOTOPE.ori determined by ORTHOTOPE.siz and ORTHOTOPE.end.
- Functional dependency: ORTHOTOPE.siz determined by ORTHOTOPE.ori and ORTHOTOPE.end.
- Functional dependency: ORTHOTOPE.end determined by ORTHOTOPE.ori and ORTHOTOPE.siz.
- Contractible wrt. ORTHOTOPE.

Usage   Used in the **Arc constraint(s)** slot for defining some constraints like diffn, place_in_pyramid or orths_are_connected.

Used in   diffn, orth_on_the_ground, orth_on_top_of_orth, orths_are_connected, two_orth_are_in_contact, two_orth_column, two_orth_do_not_overlap, two_orth_include.

Keywords

Arc input(s)	ORTHOTOPE
Arc generator	$SELF \mapsto$ collection(orthotope)
Arc arity	1
Arc constraint(s)	orthotope.ori + orthotope.siz = orthotope.end
Graph property(ies)	**NARC**= |ORTHOTOPE|

Graph model   Parts (A) and (B) of Figure 5.650 respectively show the initial and final graph associated with the **Example** slot. Since we use the **NARC** graph property, the loops of the final graph are stressed in bold.
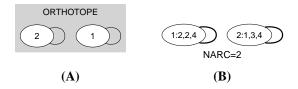

(A)   **(B)**

Figure 5.650: Initial and final graph of the orth_link_ori_siz_end constraint

Signature   Since we use the $SELF$ arc generator on the ORTHOTOPE collection the number of arcs of the initial graph is equal to \|ORTHOTOPE\|. Therefore the maximum number of arcs of the final graph is also equal to \|ORTHOTOPE\|. For this reason we can rewrite the graph property **NARC** = \|ORTHOTOPE\| to **NARC** $\geq$ \|ORTHOTOPE\| and simplify $\overline{\mathbf{NARC}}$ to **NARC**.