5.418 vec_eq_tuple

Origin   Used for defining in_relation.

Constraint   vec_eq_tuple(VARIABLES, TUPLE)

Arguments   VARIABLES : collection(var−dvar)
                    TUPLE   : collection(val−int)

Restrictions   required(VARIABLES, var)
                    required(TUPLE, val)
                    $|\text{VARIABLES}| = |\text{TUPLE}|$

Purpose   Enforce a vector of domain variables to be equal to a tuple of values.

Example $(\langle 5, 3, 3 \rangle , \langle 5, 3, 3 \rangle)$

                    The vec_eq_tuple constraint holds since the first, the second and the third items
                    of VARIABLES $= \langle 5, 3, 3 \rangle$ are respectively equal to the first, the second and the third items
                    of TUPLE $= \langle 5, 3, 3 \rangle$.

Typical $|\text{VARIABLES}| > 1$
                    $\text{range}(\text{VARIABLES.var}) > 1$
                    $\text{range}(\text{TUPLE.val}) > 1$

Symmetries   • Arguments are permutable w.r.t. permutation (VARIABLES, TUPLE).
                    • Items of VARIABLES and TUPLE are permutable (*same permutation used*).

Arg. properties Contractible wrt. VARIABLES and TUPLE (*remove items from same position*).

Used in   in_relation.

See also   **generalisation:** lex_equal (integer *replaced by* variable *in second argument*).
                    implies: lex_equal.

Keywords   **characteristic of a constraint:** tuple.
                    constraint type: value constraint.
                    filtering: arc-consistency.

Arc input(s)	VARIABLES TUPLE
Arc generator	$PRODUCT(=) \mapsto$ collection(variables, tuple)
Arc arity	2
Arc constraint(s)	variables.var = tuple.val
Graph property(ies)	**NARC**= |VARIABLES|

Graph model Parts (A) and (B) of Figure 5.796 respectively show the initial and final graph associated with the **Example** slot. Since we use the **NARC** graph property, the arcs of the final graph are stressed in bold.
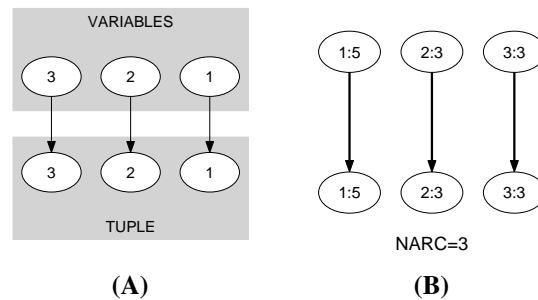

Figure 5.796: Initial and final graph of the vec_eq_tuple constraint

Signature Since we use the arc generator $PRODUCT(=)$ on the collections VARIABLES and TUPLE, and because of the restriction $|\texttt{VARIABLES}| = |\texttt{TUPLE}|$, the maximum number of arcs of the final graph is equal to $|\texttt{VARIABLES}|$. Therefore we can rewrite the graph property $\textbf{NARC} = |\texttt{VARIABLES}|$ to $\textbf{NARC} \geq |\texttt{VARIABLES}|$ and simplify $\overline{\underline{\textbf{NARC}}}$ to $\overline{\textbf{NARC}}$.