

5.308 ordered_atmost_nvector

	DESCRIPTION	LINKS	GRAPH
Origin	Conjoin <code>atmost_nvector</code> and <code>lex_chain_lesseq</code> .		
Constraint	<code>ordered_atmost_nvector(NVEC, VECTORS)</code>		
Synonyms	<code>ordered_atmost_vectors</code> , <code>ordered_atmost_npoint</code> , <code>ordered_atmost_npoints</code> .		
Type	VECTOR : <code>collection(var-dvar)</code>		
Arguments	NVEC : <code>dvar</code> VECTORS : <code>collection(vec - VECTOR)</code>		
Restrictions	$ \text{VECTOR} \geq 1$ $\text{NVEC} \geq \min(1, \text{VECTORS})$ <code>required(VECTORS, vec)</code> <code>same_size(VECTORS, vec)</code>		
Purpose	<p>Enforces the following two conditions:</p> <ol style="list-style-type: none"> 1. The number of distinct tuples of values taken by the vectors of the collection <code>VECTORS</code> is less than or equal to <code>NVEC</code>. Two tuples of values $\langle A_1, A_2, \dots, A_m \rangle$ and $\langle B_1, B_2, \dots, B_m \rangle$ are <i>distinct</i> if and only if there exist an integer $i \in [1, m]$ such that $A_i \neq B_i$. 2. For each pair of consecutive vectors <code>VECTOR_i</code> and <code>VECTOR_{i+1}</code> of the <code>VECTORS</code> collection we have that <code>VECTOR_i</code> is lexicographically less than or equal to <code>VECTOR_{i+1}</code>. Given two vectors, \vec{X} and \vec{Y} of n components, $\langle X_0, \dots, X_{n-1} \rangle$ and $\langle Y_0, \dots, Y_{n-1} \rangle$, \vec{X} is <i>lexicographically less than or equal to</i> \vec{Y} if and only if $n = 0$ or $X_0 < Y_0$ or $X_0 = Y_0$ and $\langle X_1, \dots, X_{n-1} \rangle$ is lexicographically less than or equal to $\langle Y_1, \dots, Y_{n-1} \rangle$. 		
Example	$\left(3, \left\langle \begin{array}{l} \text{vec} - \langle 5, 6 \rangle, \\ \text{vec} - \langle 5, 6 \rangle, \\ \text{vec} - \langle 5, 6 \rangle, \\ \text{vec} - \langle 9, 3 \rangle, \\ \text{vec} - \langle 9, 3 \rangle \end{array} \right\rangle \right)$		
	<p>The <code>ordered_atmost_nvector</code> constraint holds since:</p> <ol style="list-style-type: none"> 1. The collection <code>VECTORS</code> involves at most 3 distinct tuples of values (i.e., in fact the 2 distinct tuples $\langle 5, 6 \rangle$ and $\langle 9, 3 \rangle$). 2. The vectors of the collection <code>VECTORS</code> are sorted in increasing lexicographical order. 		
Typical	$ \text{VECTOR} > 1$ $\text{NVEC} > 1$ $\text{NVEC} < \text{VECTORS} $ $ \text{VECTORS} > 1$		

Symmetry	NVEC can be increased .
Arg. properties	Contractible wrt. VECTORS.
Reformulation	The <code>ordered_atmost_nvector</code> constraint can be reformulated as a conjunction of a atmost_nvector and a lex_chain_lesseq constraints.
See also	common keyword : <code>nvector</code> (<i>vector</i>). comparison swapped : <code>ordered_atleast_nvector</code> . implied by : <code>ordered_nvector</code> (\leq NVEC replaced by $=$ NVEC). implies : <code>atmost_nvector</code> , <code>lex_chain_lesseq</code> (NVEC <i>of constraint ordered_atmost_nvector removed</i>). used in graph description : <code>lex_less</code> , <code>lex_lesseq</code> .
Keywords	characteristic of a constraint : <code>vector</code> . constraint type : counting constraint, order constraint. symmetry : symmetry.

Arc input(s)	VECTORS
Arc generator	$\text{PATH} \mapsto \text{collection}(\text{vectors1}, \text{vectors2})$
Arc arity	2
Arc constraint(s)	$\text{lex_lesseq}(\text{vectors1.vec}, \text{vectors2.vec})$
Graph property(ies)	$\text{NARC} = \text{VECTORS} - 1$
Arc input(s)	VECTORS
Arc generator	$\text{PATH} \mapsto \text{collection}(\text{vectors1}, \text{vectors2})$
Arc arity	2
Arc constraint(s)	$\text{lex_less}(\text{vectors1.vec}, \text{vectors2.vec})$
Graph property(ies)	$\text{NCC} \leq \text{NVEC}$

Graph model

Parts (A) and (B) of Figure 5.646 respectively show the initial and final graph of the second graph constraint associated with the **Example** slot. Since we use the **NCC** graph property in this second graph constraint, we show the different connected components of the final graph. Each strongly connected component corresponds to a tuple of values that is assigned to some vectors of the **VECTORS** collection. The 2 following tuple of values $\langle 5, 6 \rangle$ and $\langle 9, 3 \rangle$ are used by the vectors of the **VECTORS** collection.

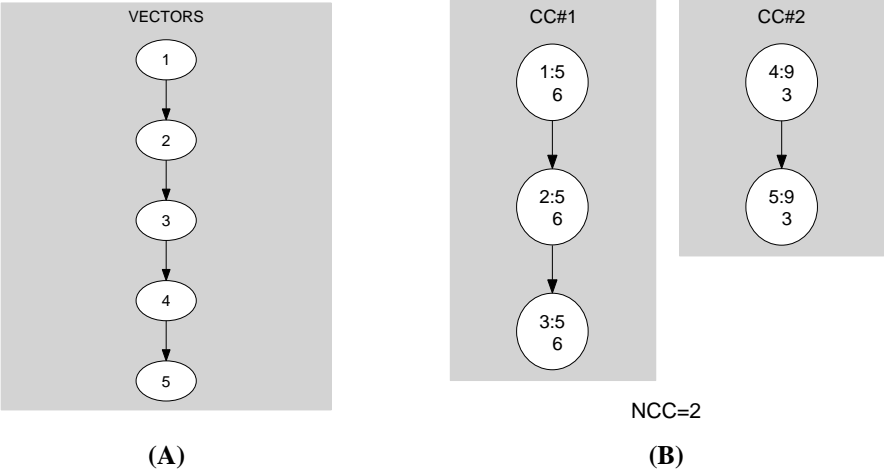


Figure 5.646: Initial and final graph of the `ordered_atmost_nvector` constraint

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