

5.246 max_occ_of_consecutive_tuples_of_values

	DESCRIPTION	LINKS
Origin	Design.	
Constraint	max_occ_of_consecutive_tuples_of_values(MAX, K, VECTORS)	
Type	VECTOR : collection(var—dvar)	
Arguments	MAX : int K : int VECTORS : collection(vec — VECTOR)	
Restrictions	required(VECTOR, var) VECTOR ≥ 2 alldifferent(VECTOR) MAX ≥ 1 K ≥ 2 K < VECTOR required(VECTORS, vec) VECTORS ≥ 1 same_size(VECTORS, vec)	
Purpose	MAX is equal to the maximum number of occurrences of identical vectors derived from the vectors VECTORS in the following way. To each vector $\langle v_1, v_2, \dots, v_m \rangle$ of VECTORS (with v_1, v_2, \dots, v_m distinct) we generate all vectors $\langle u_1, u_2, \dots, u_K \rangle$ such that $u_1 = v_p, u_2 = v_{p+1}, \dots, u_K = v_{p+K-1}$ or $u_1 = v_{p+K-1}, u_2 = v_{p+K-2}, \dots, u_K = v_p$ (with $1 \leq p \leq m - K + 1$).	
Example	$(1, 2, \langle \text{vec} - \langle 4, 1, 3 \rangle, \text{vec} - \langle 2, 7, 6 \rangle, \text{vec} - \langle 5, 9, 8 \rangle \rangle)$	
	Given the three vectors of the example we respectively generate: <ul style="list-style-type: none">the pairs $\langle 4, 1 \rangle, \langle 1, 4 \rangle, \langle 1, 3 \rangle, \langle 3, 1 \rangle$ from the triple $\langle 4, 1, 3 \rangle$,the pairs $\langle 2, 7 \rangle, \langle 7, 2 \rangle, \langle 7, 6 \rangle, \langle 6, 7 \rangle$ from the triple $\langle 2, 7, 6 \rangle$,the pairs $\langle 5, 9 \rangle, \langle 9, 5 \rangle, \langle 9, 8 \rangle, \langle 8, 9 \rangle$ from the triple $\langle 5, 9, 8 \rangle$. Putting these pairs together, we get the set of pairs $\{\langle 1, 3 \rangle, \langle 1, 4 \rangle, \langle 2, 7 \rangle, \langle 3, 1 \rangle, \langle 4, 1 \rangle, \langle 5, 9 \rangle, \langle 6, 7 \rangle, \langle 7, 2 \rangle, \langle 7, 6 \rangle, \langle 8, 9 \rangle, \langle 9, 5 \rangle, \langle 9, 8 \rangle\}$. The max_occ_of_consecutive_tuples_of_values constraint holds since the components of each of the original three vectors are distinct, and since MAX is set to one and all the generated pairs are distinct.	
Typical	MAX = 1 K = 2 VECTORS > 2	

Arg. properties

- **Functional dependency**: MAX determined by K and VECTORS.
- **Contractible** wrt. VECTORS when $MAX = 1$.

Usage

This constraint occurs in balanced block design problems [363].

See also

common keyword: `max_occ_of_sorted_tuples_of_values`,
`max_occ_of_tuples_of_values` (*vector*).

Keywords

characteristic of a constraint: *vector*.
modelling: functional dependency.