

A Constraint on the Number of Distinct Vectors with Application to SLAM

Gilles Chabert and Luc Jaulin

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Outline

A Constraint
on the
Number of
Distinct
Vectors with
Application to
SLAM

The SLAM
problem

The NVector
constraint

Algorithm

Complexity
issue

- 1 The SLAM problem
- 2 The NVector constraint
- 3 Algorithm
- 4 Complexity issue

The SLAM problem

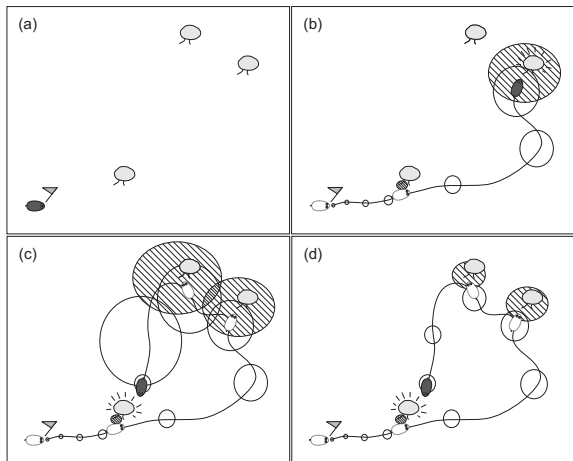
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Potential mistakes : omission, illusion, mismatching.

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The NVector constraint

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Let $\mathbf{x}^{(i)}$ be the position of the object corresponding to the i^{th} detection.

$$\text{atmost_nvector}(n, \{\mathbf{x}^{(1)}, \dots, \mathbf{x}^{(k)}\}) \\ \iff |\{\mathbf{x}^{(1)}, \dots, \mathbf{x}^{(k)}\}| \leq n.$$

The NVector constraint

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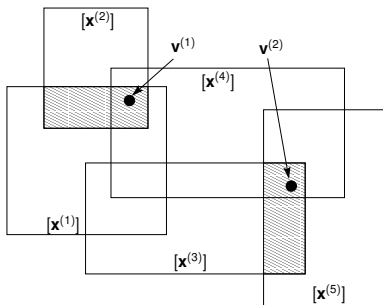
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Initial state

The NVector constraint

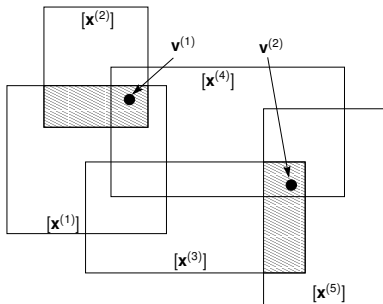
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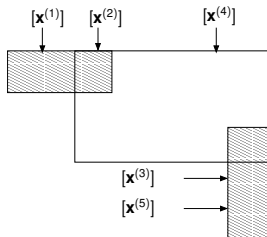
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Initial state



Final state

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In one dimension



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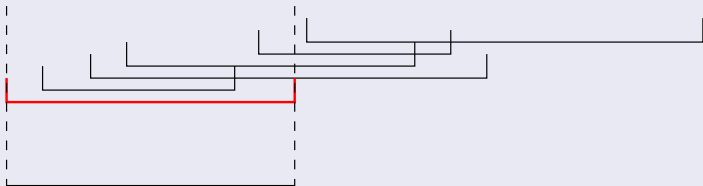
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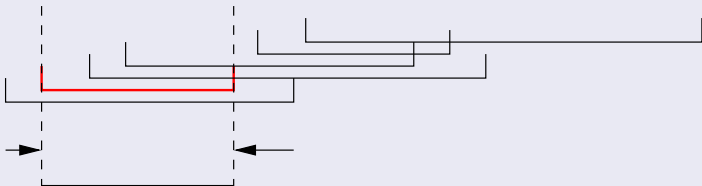
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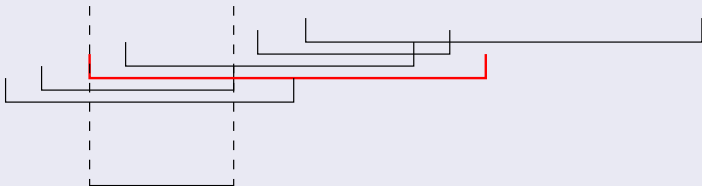
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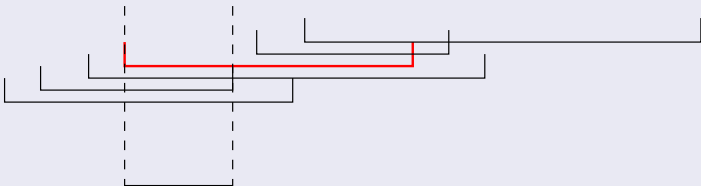
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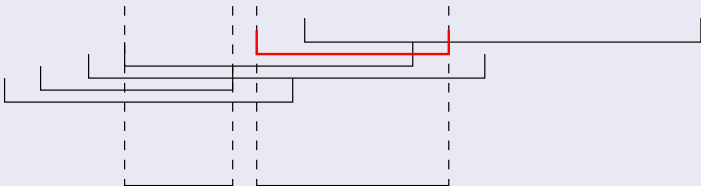
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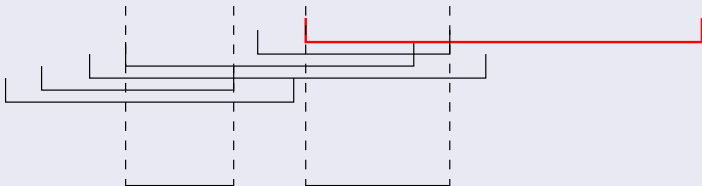
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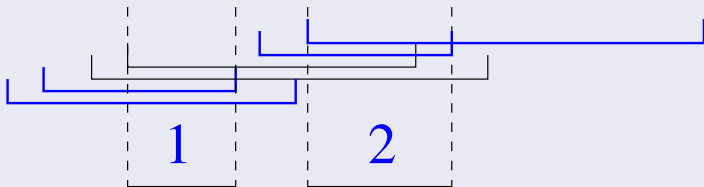
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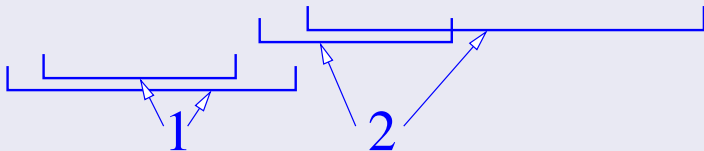
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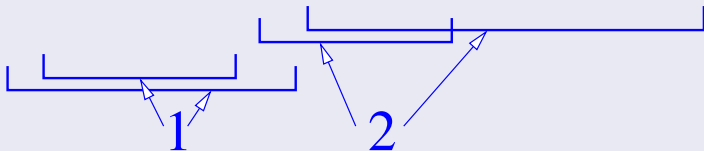
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This process can be repeated on every dimension.

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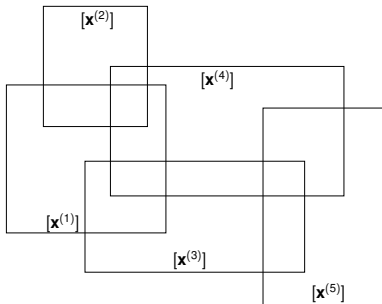
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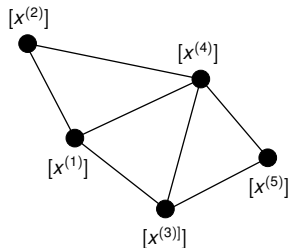
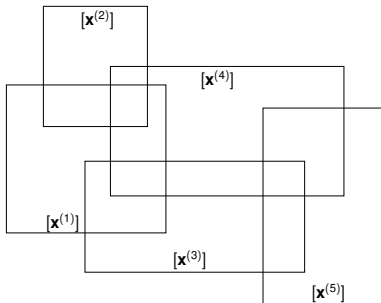
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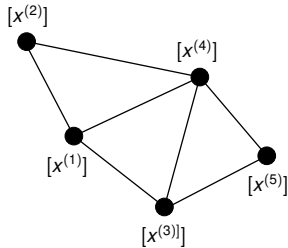
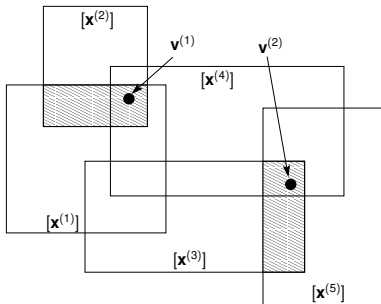
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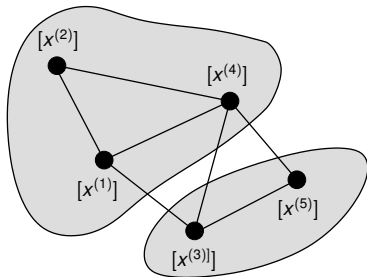
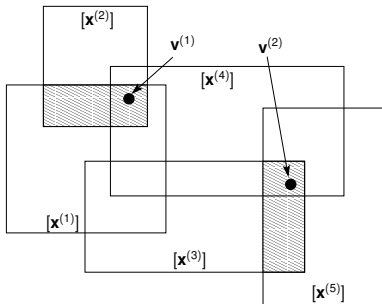
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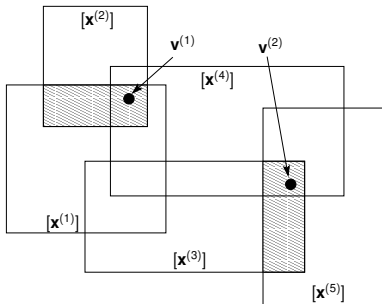
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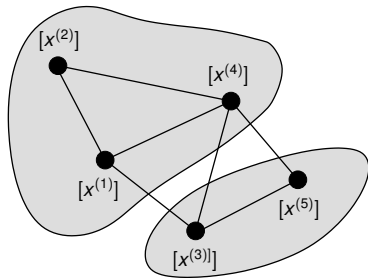
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Detections



Rectangle graph

Complexity issue

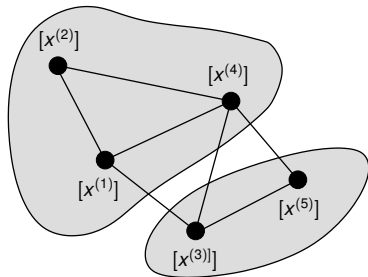
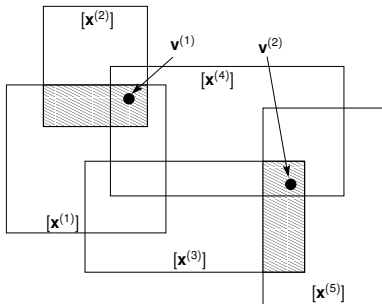
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Detections

Rectangle graph

RCP

Can a rectangle graph be partitioned into n cliques ?

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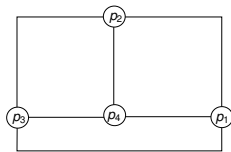
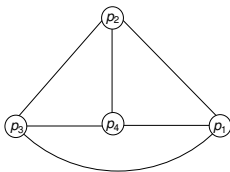
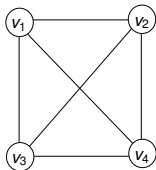
Complexity
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From planar vertex cover to rectangle clique partition

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