Static Program Checking

Dynamic systems in Alloy

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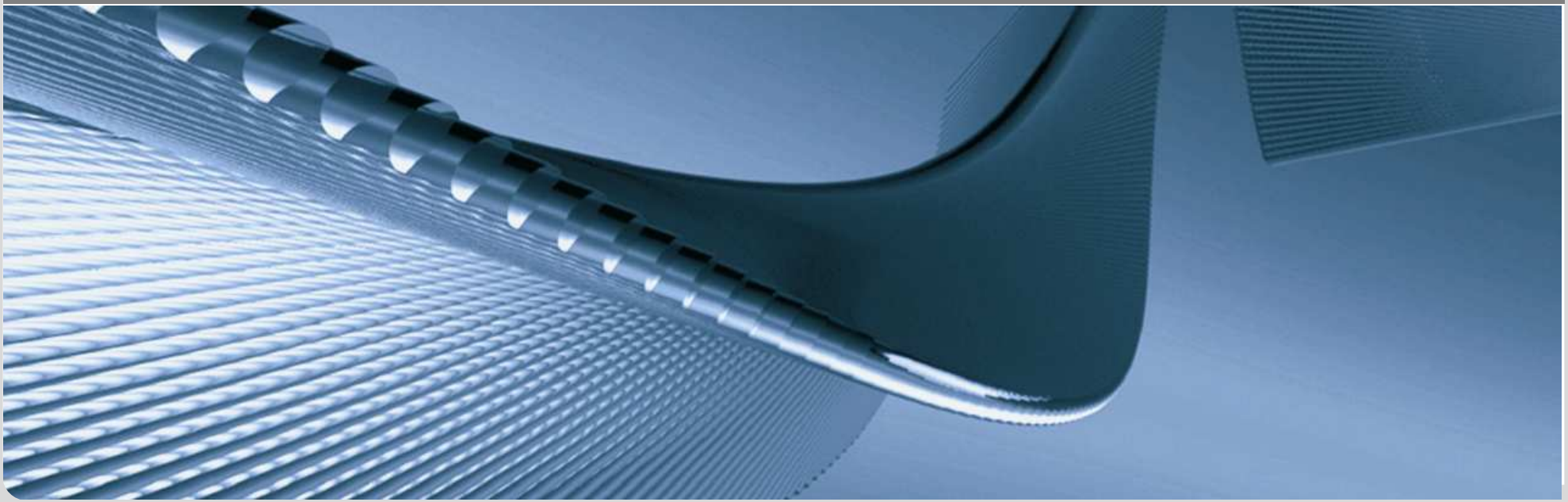
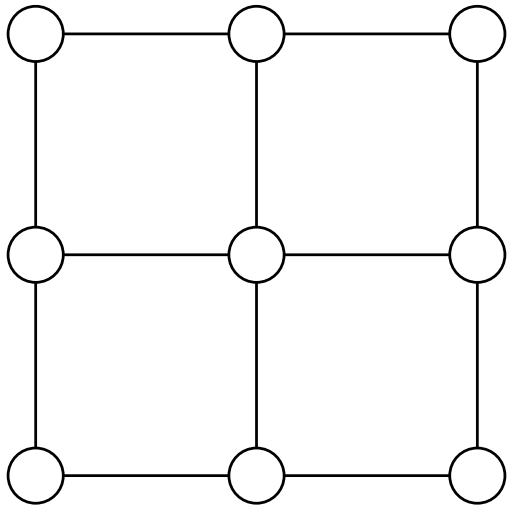


Spanning Tree

Definition

A tree is an undirected connected acyclic graph. A spanning tree of a connected undirected graph is a tree that includes all vertices.



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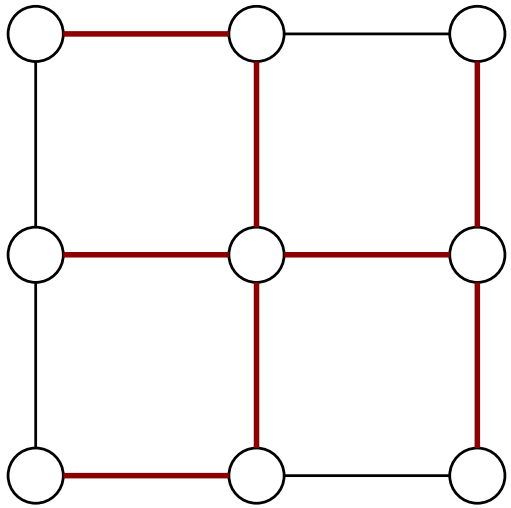

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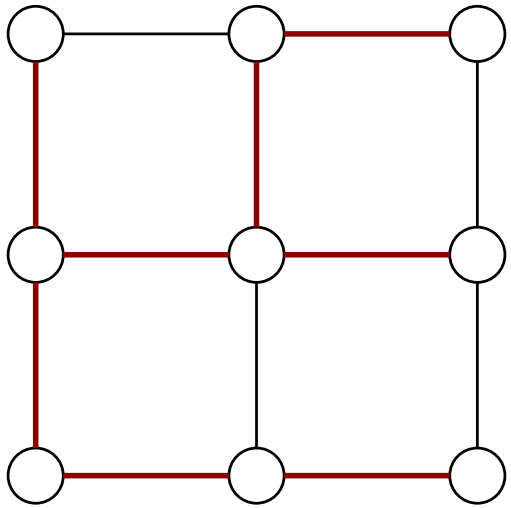


Dynamic Systems

The “state” of the system changes. The state can be modeled in Alloy as:

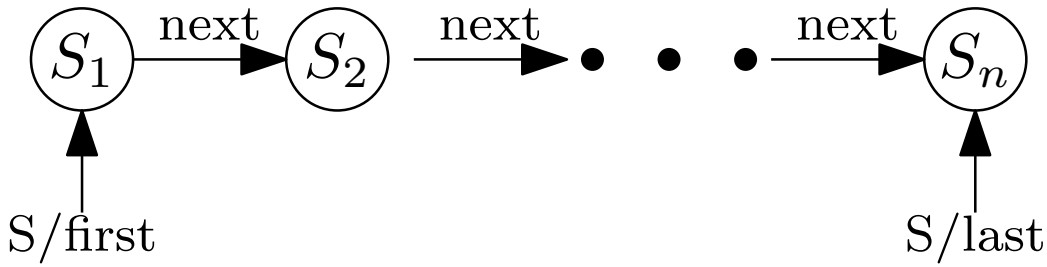
- Local State:
  Makes each dynamic relation depending on an additional ordered type (Time)
- Global State:
  Introduces a state type (State) containing all (dynamic) relations
- In mathematical terms, almost the same:
  $r \subseteq S_1 \times \cdots \times S_n \times \mathit{Time}$
  $r \subseteq \mathit{State} \times S_1 \times \cdots \times S_n$

Ordering

For scope of *S* equal to *n* and

```
1  /open util/ordering[S]
2  sig S {...}
3  ...
```

- Any interpretation of *S* looks like:



- Can avoid the use of Integers
- Increases the efficiency