Outline
Overview of formal models
Sequential active set membrane systems
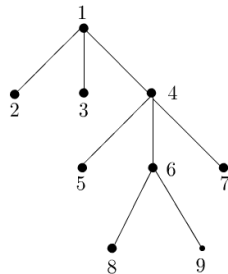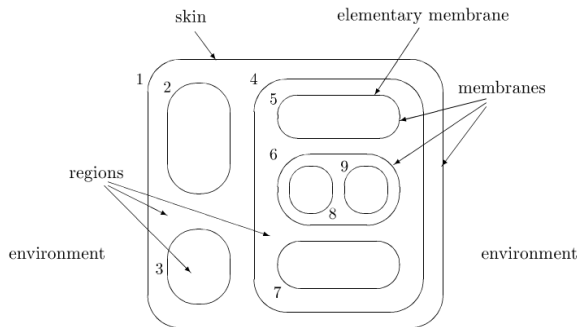
Sequential P Systems with Active Membranes Working on Sets
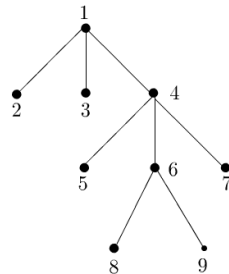
Michal Kováč

FMFI UK, Slovakia

30.9.2015

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P systems
Models with set semantics

Membrane structure

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Membrane structure

- Multisets

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Membrane structure

- Multisets
- Rewriting rules

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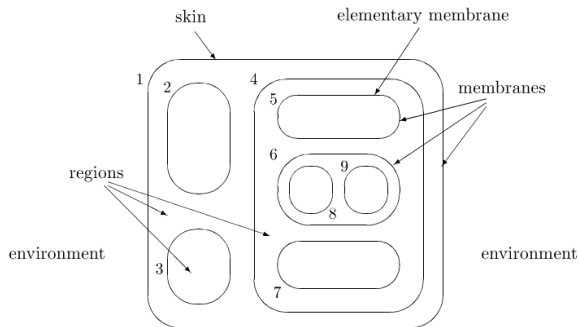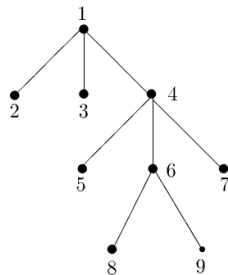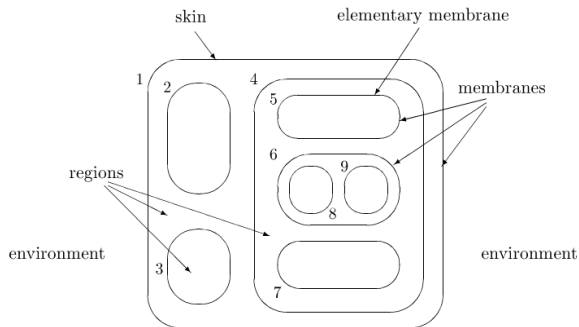
P systems
Models with set semantics

Membrane structure
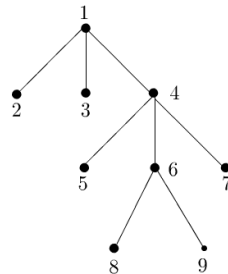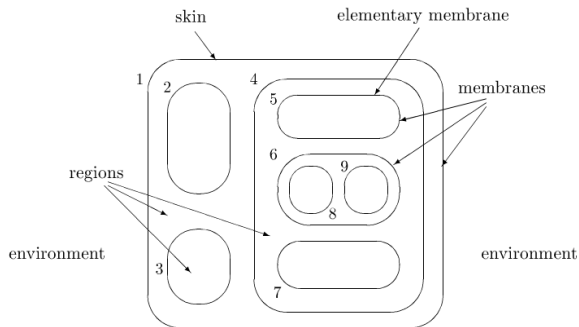
- Multisets
- Rewriting rules
- Passive vs. Active

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P system with active membranes

- $\Pi = (\Sigma, C_0, R_1, \ldots R_m)$

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P system with active membranes

- $\Pi = (\Sigma, C_0, R_1, \ldots R_m)$
- $C = (T, l, c)$
  - $l : V(T) \to \{1, \ldots, m\}$
  - $c : V(T) \to \mathbb{N}^{\Sigma}$

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P system with active membranes

- $\Pi = (\Sigma, C_0, R_1, \ldots R_m)$
- $C = (T, l, c)$
    - $l : V(T) \to \{1, \ldots, m\}$
    - $c : V(T) \to \mathbb{N}^{\Sigma}$
- Rewriting rules
    - $u \to v$
    - $u \to v\delta$
    - $u \to [_j v]_j$,
      where $u \in \mathbb{N}^{\Sigma}, |u| \geq 1$ and $v \in \mathbb{N}^{\Sigma \times \{\cdot, \uparrow, \downarrow_j\}}$

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Computation

- Maximal parallel vs. sequential

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Computation

- Maximal parallel vs. sequential
- Language
  - generating mode
  - accepting mode

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Multiset vs. set semantics

- How realistic is the counting?
- Effectiveness of verification techniques
- No conflict (objects can participate as reactants in as many rules as they want)

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Reaction systems

TODO: definition

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Set membane systems

- Alhazov [Alhazov, 2006]: multiplicities of objects are ignored R, with active membranes universal

- Kleijn, Koutny [Kleijn and Koutny, 2011]: ̈min-enabled ̈computational step ⇒ sequential   R

- maximal parallel ⇒ deterministic

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Original semantics
inject-or-create semantics
wrap-or-create semantics

Sequential active set membrane systems

TODO: definition

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Proof of universality

TODO: proof of universality

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📄 Alhazov, A. (2006).
P systems without multiplicities of symbol-objects.
Information Processing Letters, 100(3):124–129.

📄 Kleijn, J. and Koutny, M. (2011).
Membrane systems with qualitative evolution rules.
Fundam. Inf., 110(1-4):217–230.

Thanks for your attention!