Unambiguous Languages Exhaust the Index Hierarchy

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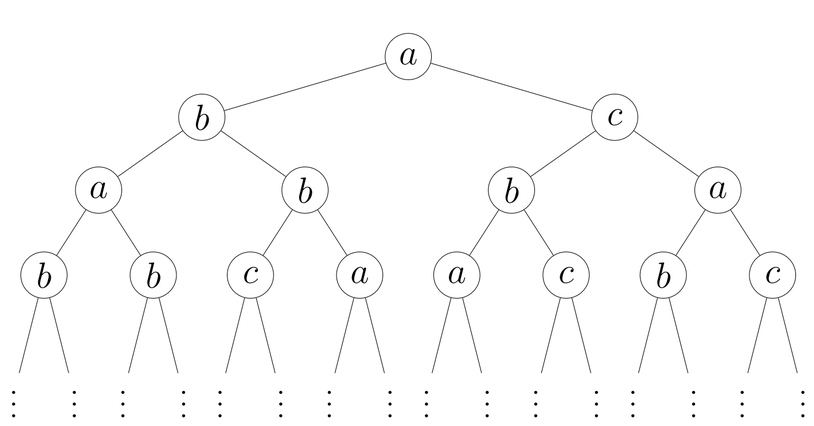
Tree automata



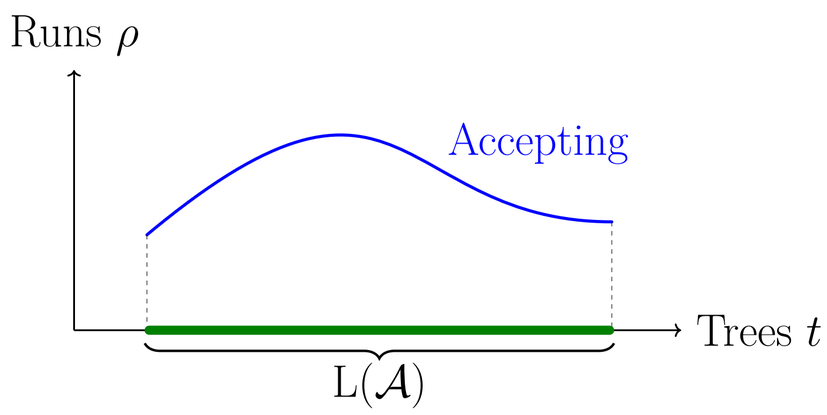
Non-deterministic parity automata running over infinite trees.

$\mathrm{L}(\mathcal{A}) \stackrel{\text{def}}{=} \{t \in \mathrm{Trees}_A \mid \exists \rho.\ \rho \text{ is an accepting run of } \mathcal{A} \text{ over } t\}$

Unambiguous languages

L is unambiguous if $L = \mathrm{L}(\mathcal{A})$ s.t.

$\forall t \in L.\ \exists!\rho.\ \rho$ is an accepting run of $\mathcal{A}$ over t.

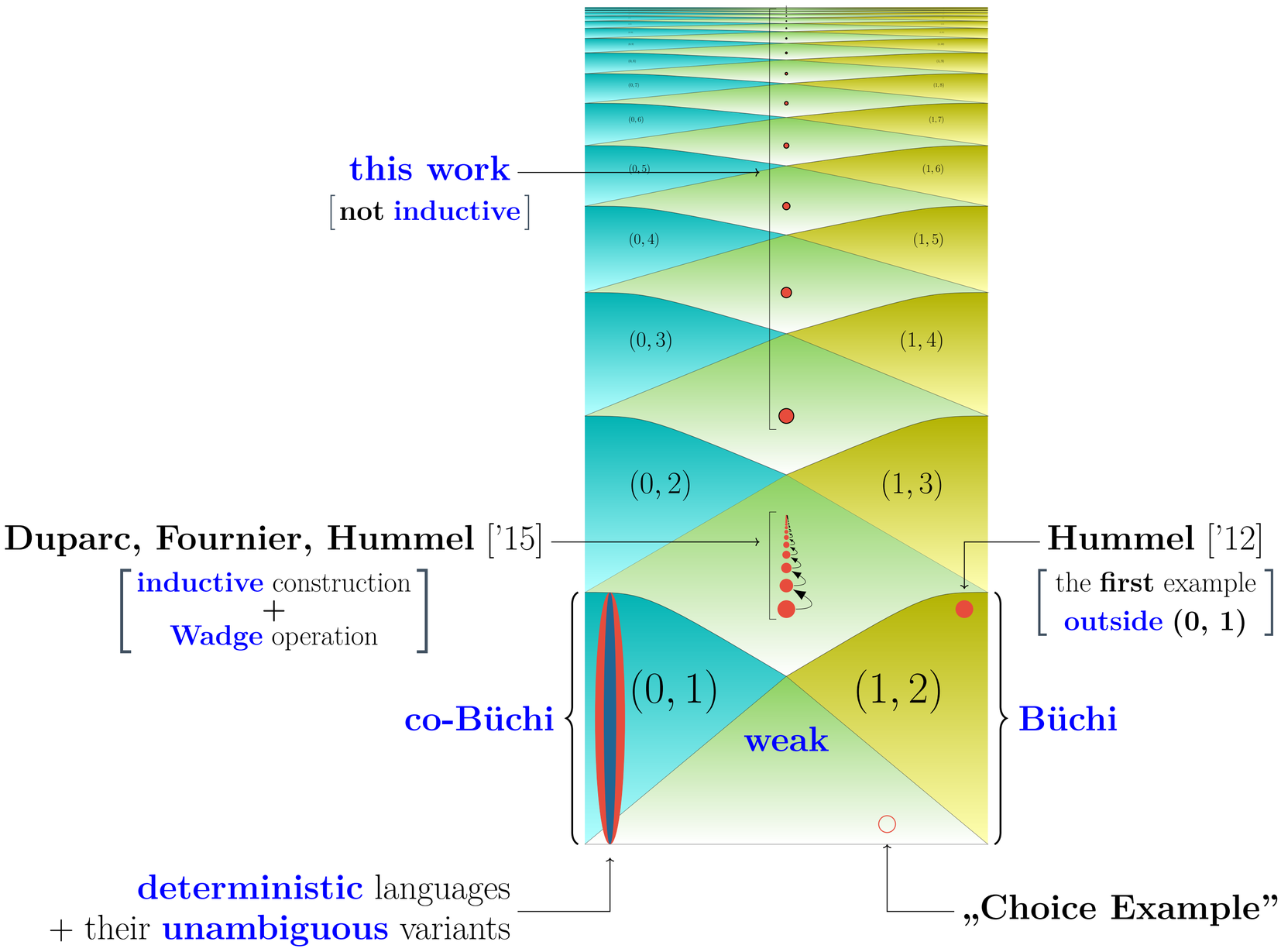


„Choice Example”

Theorem 1 (Niwiński, Walukiewicz [’96])**.**
The language of trees over $\{a, b\}$ that contain some occurrence of a is **not** *unambiguous.*

Main result

Theorem 2.
For every $i < j$ there exists an unambiguous language $L_{i,j}$ such that:
if $\mathcal{A}$ is an alternating parity tree automaton of index (i, j) then $\mathrm{L}(\mathcal{A}) \neq L_{i,j}$.



$\mathcal{A}_{i,j}$