1 List Of Models

1.1 Infinite Words

- DBA
- NBA
- GBA
- Rabin automaton
- Muller automaton
- Parity automaton
- E automaton
- A automaton
- coBA
- weak BA
- Staiger-Wagner automaton
- ABA
- LTL
- S1S
- $\exists$S1S
- $S1S_0$

1.2 Finite Trees

- DTA
- NTA
- $\downarrow$DTA
- $\downarrow$NTA
- DUTA
- NUTA
- DTD
- deterministic EDTD
- single-type EDTD

- EDTD
- Relax NG
- FO
- MSO
- Regular expressions
- DTWA
- TWA

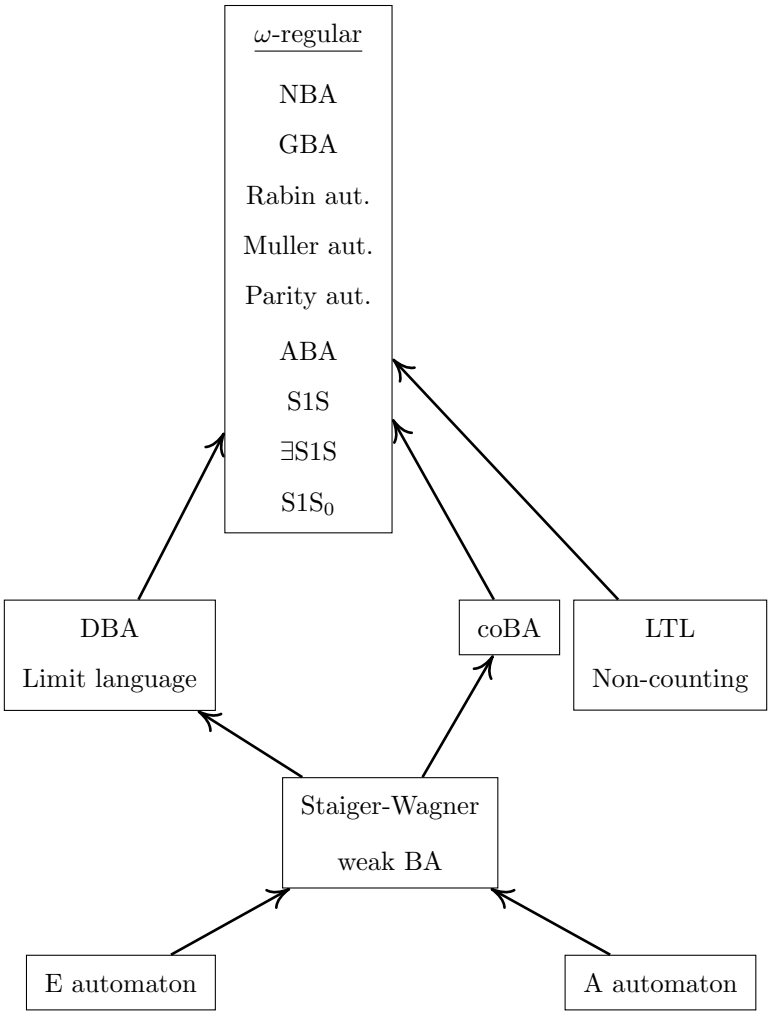
1.3 Infinite Trees

- BTA
- Muller TA
- Parity TA
- DMTA
- S2S (MSO / WMSO)
- $S2S_0$ (MSO / WMSO)

2 List Of Games

- Büchi
- Staiger-Wagner
- weak Parity
- Reachability
- Safety
- Muller
- Parity
- Rabin
- Streett
- Gale-Stewart
- Wadge

3 Infinite Word Models



3.1 Class Inclusions

- E aut. $\subseteq$ Staiger-Wagner
  Proof: SWA with $\mathcal{F} = \{Q' \subseteq Q \mid F \cap Q' \neq \emptyset\}$.
- A. aut. $\subseteq$ Staiger-Wagner
  Proof: SW closed under complement,
- Staiger-Wagner $\subseteq$ DBA / coBA
  Proof: $\mathcal{A}$ SWA $\Rightarrow \mathcal{A}' = (Q \times 2^Q, \Sigma, (q_0, \emptyset), \delta', F')$
  Collect all visited states and accept if that set stays in $\mathcal{F}$.

- DBA $\subseteq$ NBA
  trivial
- coBA $\subseteq$ NBA
  Proof: NBA closed under complement.
- LTL $\subseteq$ NBA
  Proof: **??**

3.2 Class Exclusions

- E aut. $\not\subseteq$ A aut.
  Example: $(a+b)^*a(a+b)^\omega$
- A aut. $\not\subseteq$ E aut.
  Example: $\{a^\omega\}$
- DBA $\not\subseteq$ coBA
  Example: $(a^*b)^\omega$
- coBA $\not\subseteq$ DBA
  Example: $(a+b)^*a^\omega$
- LTL $\not\subseteq$ NBA
  Example: $((a+b)a)^\omega$

3.3 Class Equalities

3.3.1 NBA

- NBA $\Rightarrow$ ω-regular
  Proof: **??**
- ω-regular $\Rightarrow$ NBA
  Proof: **??**
- NBA $\Rightarrow$ $\exists$S1S
  Proof: **??**
- S1S $\Rightarrow$ S1S_0
  Proof: **??**
- S1S_0 $\Rightarrow$ NBA
  Proof: **??**
- Det. Muller $\Rightarrow$ NBA
  Proof: NBA with $L(\mathcal{A}) = \bigcup_{F\in\mathcal{F}} \left(\bigcap_{q\in F} L(\mathcal{A}_q) \cap \bigcap_{q\notin F} \overline{L(\mathcal{A}_q)} \right)$ where $\mathcal{A}_q$ is $\mathcal{A}$ starting in q.
- NBA $\Rightarrow$ det. Muller
  Proof: **??**

- (det.) Muller ⇒ (det.) Parity
  Proof: **??**

3.3.2 LTL

LTL ⇔ Non-counting
No proof. Remarks in F8.

3.4 Closures

3.4.1 NBA

- Closed under union
  Proof: **??**
- Closed under intersection
  Proof: **??**
- Closed under complement
  Proof: **??**

3.4.2 DBA

- Not closed under complement (inf. many $a \leftrightarrow$ fin. many a)

3.5 Characterizations

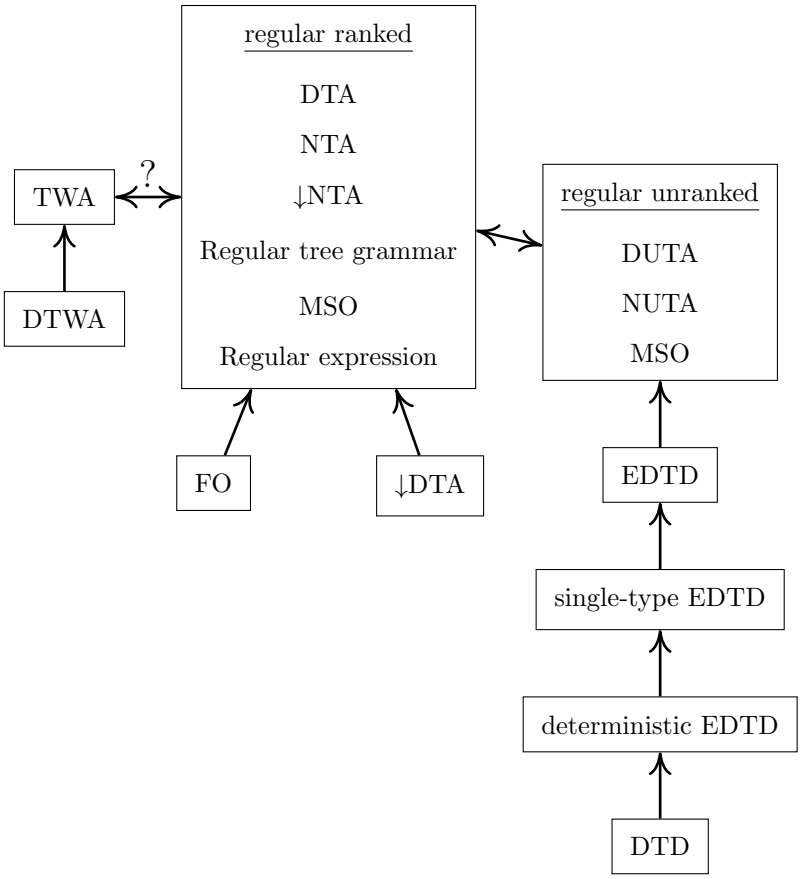
- Parity conditions are directly convertible to Rabin chain conditions and vice-versa.
  Proof: Assign priorities in ascending order; $E_k \to 0$, $F_k \setminus E_k \to 1$, $E_{k-1} \setminus F_k \to 2 \ldots$
- U is ω-regular iff U is a Boolean combination of DBA-languages
  Proof: NBAs are closed under Boolean operations.
- U is DBA-recog. iff $U = \lim(L)$ for some regular $L \subseteq \Sigma^*$.
  Proof: **??**

3.6 Problems / Complexity

3.6.1 NBA

- Emptiness problem decidable in poly. time
  Proof: **??**

4 Finite Tree Models



4.1 Class Differences

TODO

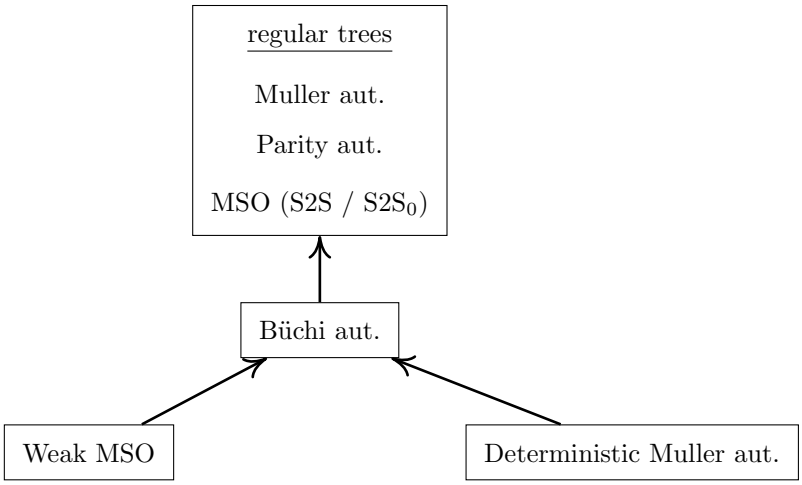
4.2 Class Equalities

TODO

4.3 Closures

TODO

5 Infinite Tree Models



5.1 Class Differences

TODO

5.2 Class Equalities

TODO

5.3 Closures

TODO