## The structure of weighted automata ON TREES AND TREE-LIKE GRAPHS

Erik Paul

Leipzig University

May 28, 2018


Weighted Feferman-Vaught Theorem

Weighted Feferman-Vaught Theorem

$$
A \cup B \models \beta \quad \Leftrightarrow \quad A \models \beta_{1} \text { and } B \models \beta_{2} \text { or } A \models \gamma
$$

Weighted Feferman-Vaught Theorem

$$
A \cup B \models \beta \quad \Leftrightarrow \quad A \models \beta_{1} \text { and } B \models \beta_{2} \text { or } A \models \gamma
$$

Büchi-type result for Quantitative Monitor Automata

Weighted Feferman-Vaught Theorem

$$
A \cup B \models \beta \quad \Leftrightarrow \quad A \models \beta_{1} \text { and } B \models \beta_{2} \text { or } A \models \gamma
$$

Büchi-type result for Quantitative Monitor Automata

$$
L \text { recognizable by NFA } \quad \Leftrightarrow \quad L \text { definable in MSO }
$$

Weighted Feferman-Vaught Theorem

$$
A \cup B \models \beta \quad \Leftrightarrow \quad A \models \beta_{1} \text { and } B \models \beta_{2} \text { or } A \models \gamma
$$

Büchi-type result for Quantitative Monitor Automata
L recognizable by NFA
$\Leftrightarrow$
$L$ definable in MSO

Max-Plus Tree Automata

Weighted Feferman-Vaught Theorem

$$
A \cup B \models \beta \quad \Leftrightarrow \quad A \models \beta_{1} \text { and } B \models \beta_{2} \text { or } A \models \gamma
$$

Büchi-type result for Quantitative Monitor Automata
$L$ recognizable by NFA $\quad \Leftrightarrow \quad L$ definable in MSO

Max-Plus Tree Automata


Weighted Feferman-Vaught Theorem

$$
A \cup B \models \beta \quad \Leftrightarrow \quad A \models \beta_{1} \text { and } B \models \beta_{2} \text { or } A \models \gamma
$$

Büchi-type result for Quantitative Monitor Automata
L recognizable by NFA
$\Leftrightarrow$
$L$ definable in MSO

Max-Plus Tree Automata

b, 0
b, 1

## Equivalence

Unambiguity
(Finite) Sequentiality

