## Tableaux for classical propositional logic 1

Initial list for  $A_1,...A_n \models B$  is with  $\neg B$ . Closure condition: A and  $\neg A$  for some formula A occur on a branch.

## 2 Semantic tableaux for FDE

Initial list for  $A_1,...A_n \models B$  is with all  $A_n$ , + and  $B_n$ , -. Closure condition:  $A_n$ , + and  $A_n$ , - for some formula A occur on a branch.

formula 
$$A$$
 occur on a branch.  $A \wedge B, +$   $A \wedge B, A \vee B, +$   $A \vee B, A \vee B, A \vee B, +$   $A \vee B, A \vee B, -$ 

# Semantic tableaux for $K_3$ , LP, $L_3$ , $RM_3$

### 3.1 $K_3$

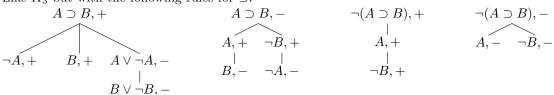
Same as for FDE with extra closure condition: A branch also closes if it contains A, + and  $\neg A$ , + for some formula A.

#### 3.2 LP

Same as for FDE with extra closure condition: A branch also closes if it contains A, — and  $\neg A$ , — for some formula A.

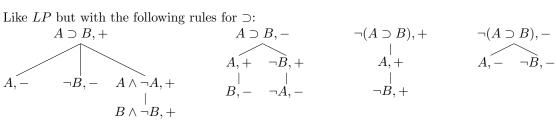
#### 3.3 $L_3$

Like  $K_3$  but with the following rules for  $\supset$ :



#### 3.4 $RM_3$

Like LP but with the following rules for  $\supset$ :



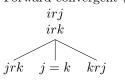
# 4 Tableaux for modal logic

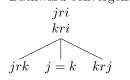
Initial list for  $A_1,...A_n \models B$  is with all  $A_n,0$  and  $\neg B,0$ . Closure condition: A,i and  $\neg A,i$  for some formula A occur on a branch with the same number i.

## 4.1 Restrictions

Reflexive  $(\rho)$ : Symmetric  $(\sigma)$ : Extendable  $(\eta)$ : irjirijriirjTransitive  $(\tau)$ : Universal (v): Dense  $(\delta)$ :  $\Box A, i$ irjirj $\Diamond A, i$ jrkirkA, jirkkrjExtra rules for =: Forward convergent  $(\varphi)$ : Backward convergent  $(\beta)$ :  $\alpha(i)$  $\alpha(i)$ irjjri

# $\begin{array}{ccc} \alpha(i) & \alpha(i) \\ i = j & j = i \\ \beta(j) & \alpha(j) \end{array}$



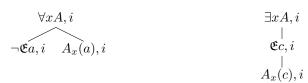


## 4.2 Tense logic

# 5 First-order modal logic

## **5.1** *CK*

## 5.2 VK



a is old, if possible; otherwise introduce a new a, c is a new variable