

Lemma

every infinite sequence of natural numbers contains increasing subsequence

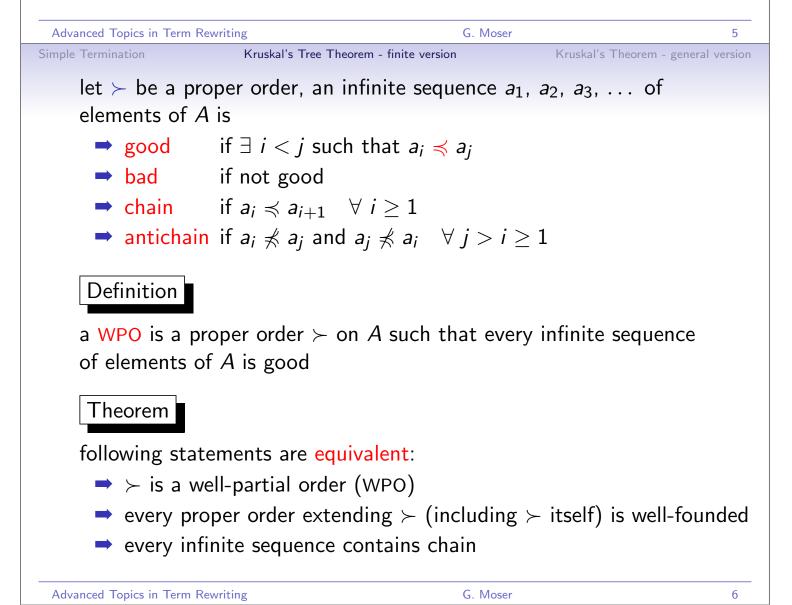
Dickson's Lemma

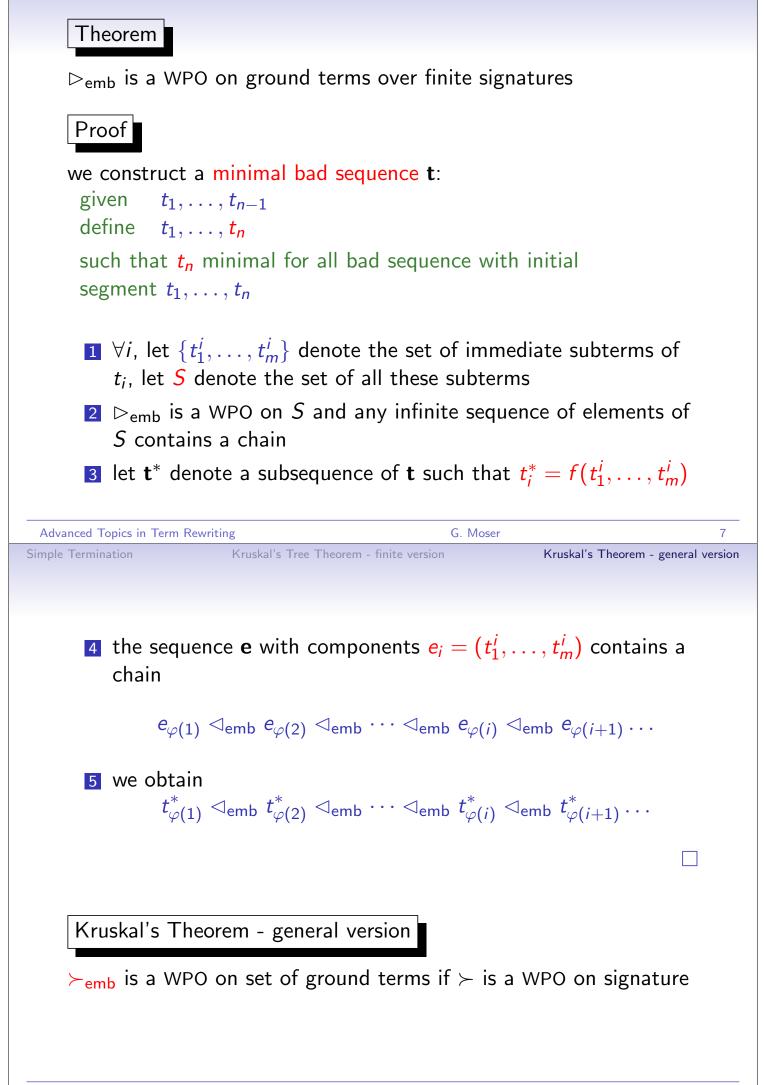
 \forall infinite sequence e_1 , e_2 , e_3 , ... of *n*-tuples of natural numbers $\exists i < j$ such that

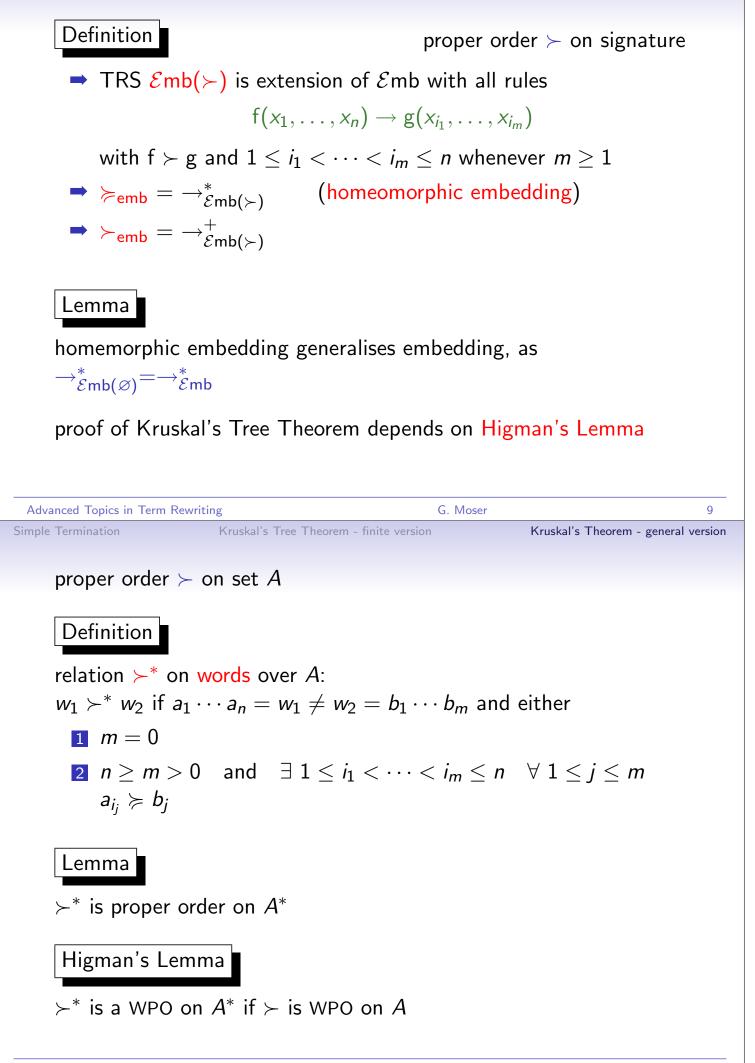
- $ightarrow e_i = (a_1, \ldots, a_n)$
- \blacktriangleright $e_j = (b_1, \ldots, b_n)$
- $ightarrow a_k \leq b_k \quad \forall \ 1 \leq k \leq n$



induction on *n* using the above lemma









simplification order is rewrite order that contains \succ_{emb} for some WPO \succ



simplification orders are well-founded



- \Rightarrow >_{lpo} (>_{kbo}) are simplification orders if > is WPO
- \Rightarrow >_{lpo} (>_{kbo}) are reduction orders if > is well-founded

Theorem

TRS is simply terminating if compatible with simplification order

➡ simply terminating TRSs are terminating

Advanced Topics in Term Rewriting

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