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## Knuth-Bendix completion

**Input:** A finite set  $E$  and a reduction order  $>$  on  $T$ .

**Output:** A finite convergent  $R$  such that  $\approx_E = \approx_R$   
or fail.

$R := \emptyset$

while  $E \neq \emptyset$  do

    Pick some  $(s \approx t) \in E$ ;  $E := E - \{s \approx t\}$ ;

    Reduce  $s, t$  to some  $R$ -normal forms  $\hat{s}, \hat{t}$ ;

    if  $\hat{s} \neq \hat{t}$  then

$(l, r) :=$  if  $\hat{s} > \hat{t}$  then  $(\hat{s}, \hat{t})$  else

            if  $\hat{t} > \hat{s}$  then  $(\hat{t}, \hat{s})$  else fail

$R := R \cup \{l \rightarrow r\}$

$E := E \cup CP(l \rightarrow r, R)$

    fi

od

Fair selection of  $s \approx t$  important!