$$\rho(w') \leq \rho(w)$$

$\bullet\ w = \cdots s_i s_{i+1} \cdots$

- Each letter s_i appears in a tree in exactly one of two ways:

- Leaf node

- Removed by conjugate node $s_i w s_i^{-1} \rightarrow w$

- Enumerate all possible cases. Show there is a node of interest $v = \cdots s_i s_i^{-1} \cdots$

- Replace subtree at v with a tree for the reduced word v' without adding leaf nodes.

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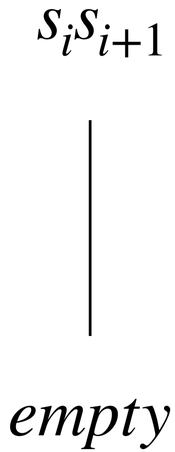
Example Case 1

s_i and s_{i+1} are removed by the same conjugation node:

$v = s_i s_{i+1}$

$\rho(v) = C(s_i s_{i+1}) = 0$



After reduction:

$\rho(v') = 0$