Logic and Language: Exercise (Week 5)

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1

2 Pregroups

2.1

(4) Forward direction:

$$\cfrac{\cfrac{}{1^l \longrightarrow 1^l 1}\ (1) \quad \cfrac{}{1^l 1 \longrightarrow 1}\ (1)}{1^l \longrightarrow 1}\ \longrightarrow$$

Backward direction:

$$\cfrac{\cfrac{}{1 \longrightarrow 1^l 1}\ (2)}{1^l}\ (1)$$

(5) Forward direction:

$$\cfrac{\cfrac{\cfrac{\cfrac{}{A^{rl} \to A^{rl}1}\ (1) \quad \cfrac{}{1 \to A^r A}\ (2)}{A^{rl} \to A^{rl}(A^r A)} \to}{A^{rl} \to (A^{rl}A^r)A}\ (1) \quad \cfrac{}{A^{rl}A^r \to 1}\ (2)}{A^{rl} \to 1A} \to \quad \cfrac{}{1A \to A}\ (1)}{A^{rl} \to A} \to$$

Backward direction:

$$\cfrac{\cfrac{\cfrac{\cfrac{}{A \to A1}\ (1) \quad \cfrac{}{1 \to A^r A^{rl}}\ (2)}{A \to A(A^r A^{rl})} \to}{A \to (AA^r)A^{rl}}\ (1) \quad \cfrac{}{AA^r \to 1}\ (3)}{A \to 1A^{rl}} \to \quad \cfrac{}{1A^{rl} \to A^{rl}}\ (1)}{A \to A^{rl}} \to$$

(6) Forward direction:

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                \cfrac{\overline{(AB)^l \to (1(AB))^l} \;\to\; \overline{1 \to (B^l A^l)^r (B^l A^l)}}{(AB)^l \to (((B^l A^l)^r (B^l A^l))(AB))^l}\;(3)
              }{(AB)^l \to ((B^l A^l)^r ((B^l A^l)(AB)))^l}\;(1)
            }{(AB)^l \to ((B^l A^l)^r (B^l (A^l (AB))))}\;(1)
          }{(AB)^l \to ((B^l A^l)^r (B^l ((A^l A)B)))}\;(1)
        \;\;\;\; \overline{A^l A \to 1}\;(2)
        }{(AB)^l \to ((B^l A^l)^r (B^l (1B)))^l}\;\to
      \;\;\;\; \overline{1B \to B}\;(1)
      }{(AB)^l \to ((B^l A^l)^r (B^l B))^l}\;\to
    \;\;\;\; \overline{B^l B \to 1}\;(2)
    }{(AB)^l \to ((B^l A^l)^r 1)^l}\; todo \;\;\; \overline{(B^l A^l)^r 1 \to (}
  }{(AB)^l \to ((B^l A^l)^r)^l}
}{(AB)^l \to B^l A^l}\;(5)
$$