1 Parsing-as-deduction rules for noisy channel

1.1 Item format

Each item has the following entries:

1. frame index (usually denoted $i, j, ...$)
2. HMM state type ($\in \{start, mid, end\}$)
3. PLU bottom type (typically denoted $A, B, ...$)
4. PLU bottom index (typically denoted $a, b, ...$)
5. edit operation type ($\in \{IB, IT, SUB\}$)
6. PLU top type (typically denoted $M, N, ...$)
7. PLU top index (denoted $m, n, ...$)
8. the probability of the item (usually P or P')

1.2 Moves in Levenshtein matrix

1.2.1 Insert Bottom

$$\frac{[i, end, A, a, , N, n, P]}{\begin{array}{c}[i+1, start, B, a+1, , N, n, \\ P' = P \cdot p(end \rightarrow start) \cdot p(op = IB) \cdot p(IB(B)) \cdot p(f_{i+1}|B, start)]\end{array}}$$

1.2.2 Insert Top

$$\frac{[i, end, A, a, , M, m, P]}{\begin{array}{c}[i, end, A, a, , N, m+1, \\ P' = P \cdot p(op = IT) \cdot p(f_i|A, end)]\end{array}}$$

1.2.3 Substitute

$$\frac{[i, end, A, a, , M, m, P]}{\begin{array}{c}[i+1, start, B, a+1, , N, m+1, \\ P' = P \cdot p(end \rightarrow start) \cdot p(op = SUB) \cdot p(SUB(B|N)) \cdot p(f_{i+1}|B, start)]\end{array}}$$

1.3 Moves in trellis