1 Problems on Sequential Decoding

• Problem 1:
  With branch likelihood function defined by
  \[ L(y, x) \triangleq \log \frac{w(y|x)}{w(y)} - n_0 R \]
  show that as long as
  \[ R < \frac{1}{n_0} I(X; Y) \]
  then on the average the likelihood will be increasing along the correct tree branches and decreasing along the incorrect ones.

• Problem 2:
  For the BSC with crossover probability \( p \):
  - Write out the expression for \( E_0(1, q) \) as defined in the hand-out notes (let \( q(0) = q(1) = \frac{1}{2} \))
  - Show that
    \[ \lim_{p \downarrow 0} \frac{E_0(1, q)}{C(p)} = 1 \]
  - Show that
    \[ \lim_{p \uparrow \frac{1}{2}} \frac{E_0(1, q)}{C(p)} = \frac{1}{2} \]
2 Problems: Chapter 8, C&T:

8.1, 8.5, 8.8