Monthly bonuses for a weather forecaster

- Before the first of the month assign one dollar to the forecaster's bonus. $b_0 = 1$
- Forecaster assigns probability p_t to rain on day t.
- If it rains on day t then $b_t = 2b_{t-1}p_t$
- If it does not rain on day t then $b_t = 2b_{t-1}(1 - p_t)$
- At the end of the month, give forecaster b_T
- Risk averse strategy: Setting $p_t = 1/2$ for all days, guarantees $b_T = 1$
- High risk prediction: Setting $p_t \in \{0, 1\}$ results in Bonus $b_T = 2^T$ if always correct, zero otherwise.
- If forecaster predicts with the true probabilities then

$$E(\log b_T) = T - H(p_T)$$

and that is the maximal expected value for $E(\log b_T)$