If $h(x)$ is sure, then $E_{\text{false}}$ can be wrong $E_t$: $P(h_t=\text{true})$

$h: X \rightarrow Y$

Remark on Warmup:
1. In general, we don't know the "not sure" region.
2. We can't conditionally apply a classifier $h_1$ to some part and $h_2$ to others.
3. Let all $h_t$ make a prediction for a given $x$, i.e. by weighted majority.

H: $P_{\text{false}}$ to decrease the weight on points if $h_t(x)=$ correct?
We should not completely remove \( x \) even if some classifiers in the past knew how to answer.

Instead, slowly decrease the weight if \( h_t \) was correct, and

\[
\text{increase the weight if } h_t \text{ wasn't correct.}
\]

Total weight of \( p_{t+1} \) puts on \( x \): \( h_t(x) = y \)

\[
\frac{1}{Z_t} (1 - \frac{3}{t}) \cdot \exp \left( -\frac{1}{2} \ln \frac{1 - \frac{3}{t}}{\frac{1}{Z_t}} \right) = \frac{1}{Z_t} (1 - \frac{3}{t}) \times \exp \left( \ln \left( \frac{1 - \frac{3}{t}}{\frac{1}{Z_t}} \right)^{-\frac{1}{2}} \right)
\]

\( h_t \) was correct on

\[
= \frac{1}{Z_t} (1 - \frac{3}{t}) \times \left( \frac{3}{1 - \frac{3}{t}} \right)^{\frac{1}{2}} = \frac{1}{Z_t} \sqrt{1 - \frac{3}{t}} \cdot \frac{1}{Z_t}
\]