# Proof (cont.)

- *Step 2*: $\text{training error}(H_{\text{final}}) \leq \prod_t Z_t$
- Proof:

$$
\begin{aligned}
\text{training error}(H_{\text{final}}) &= \frac{1}{m}\sum_i \begin{cases} 1 & \text{if } y_i \neq H_{\text{final}}(x_i) \\ 0 & \text{else} \end{cases} \\
&= \frac{1}{m}\sum_i \begin{cases} 1 & \text{if } y_i F(x_i) \leq 0 \\ 0 & \text{else} \end{cases} \\
&\leq \frac{1}{m}\sum_i \exp(-y_i F(x_i)) \\
&= \sum_i D_{\text{final}}(i) \prod_t Z_t \\
&= \prod_t Z_t
\end{aligned}
$$