Sunday, 8 January 2023 9:31 PM

$$E_{in}(h) = \frac{1}{N} \sum_{n=1}^{N} [h(x_n) \neq f(x_n)]$$

$$E_{out}(h) = P[h(x) \neq f(x)]$$

For a fixed hypothesis h.

$$P[|E_{in}(h) - E_{out}(h)| > \epsilon] \leq 2e^{-2\epsilon^2 N}$$

For any $\epsilon > 0$

Union Bound

$$P[|E_{in}(g) - E_{out}(g)| > \epsilon] \leq 2Me^{-2\epsilon^2 N}$$