Bayesian Neural Networks

$$p(y \mid x, Y_{\text{train}}, X_{\text{train}})$$

$$= \int p(y \mid x, w) \, p(w \mid Y_{\text{train}}, X_{\text{train}}) dw$$

$$= \mathbb{E}_{p(w \mid Y_{\text{train}}, X_{\text{train}})} p(y \mid x, w)$$

$$p(w \mid Y_{\text{train}}, X_{\text{train}}) \sim \{\text{Gibbs}\}?$$

$$p(w \mid Y_{\text{train}}, X_{\text{train}}) = \frac{p(Y_{\text{train}} \mid X_{\text{train}}, w) p(w)}{Z}$$