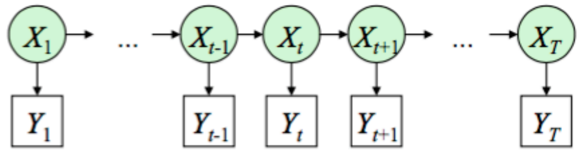
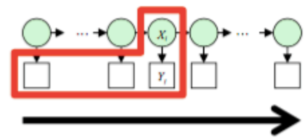
Forward-Backward algorithm



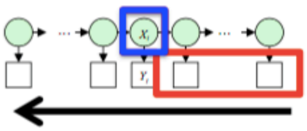
■ 前向き

$$\alpha(X_t) \equiv P(Y_1,\ldots,Y_t,X_t) = P(Y_t \mid X_t)\sum_{X_{t-1}} \alpha(X_{t-1})P(X_t \mid X_{t-1})$$



■ 後ろ向き

$$\beta(X_t) \equiv P(Y_{t+1},\ldots,Y_T \mid X_t) = \sum_{X_{t+1}} \beta(X_{t+1})P(Y_t \mid X_t)P(X_{t+1} \mid X_t)$$



■ 総合

$$\gamma(X_t) \equiv \underbrace{P(X_t \mid Y_1,\ldots,Y_T)}_{\text{隠れ変数事後確率}} \propto \alpha(X_t)\beta(X_t)$$