

- A DMC specified by $p(y|x)$ is a sequence of replicates of a **generic discrete channel** $p(y|x)$.
- T_{i-} : all the random variables in the system generated before X_i .
- Memoryless Property (Independent noise):

$$\begin{aligned}\Pr\{Y_i = \textcolor{blue}{y}, X_i = \textcolor{red}{x}, T_{i-} = t\} \\ = \Pr\{X_i = \textcolor{red}{x}, T_{i-} = t\}p(\textcolor{blue}{y}|\textcolor{red}{x})\end{aligned}$$

- Equivalently, $T_{i-} \rightarrow X_i \rightarrow Y_i$, or

Given X_i , Y_i is independent of everything in the past.