

Definition 7.4 (DMC I) A discrete memoryless channel (DMC) $p(y|x)$ is a sequence of replicates of a generic discrete channel $p(y|x)$. These discrete channels are indexed by a discrete-time index i , where $i \geq 1$, with the i th channel being available for transmission at time i . Transmission through a channel is assumed to be instantaneous. Let X_i and Y_i be respectively the input and the output of the DMC at time i , and let T_{i-} denote all the random variables that are generated in the system before X_i . The equality

$$\Pr\{Y_i = y, X_i = x, T_{i-} = t\} = \Pr\{X_i = x, T_{i-} = t\}p(y|x)$$

holds for all $(x, y, t) \in \mathcal{X} \times \mathcal{Y} \times \mathcal{T}_{i-}$.