

Definition 7.5 (DMC II) A discrete memoryless channel (α, Z) is a sequence of replicates of a generic discrete channel (α, Z) . 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 noise variable Z_i for the transmission at time i is a copy of the generic noise variable Z , and is independent of (X_i, T_{i-}) . The output of the DMC at time i is given by

$$Y_i = \alpha(X_i, Z_i).$$

Remark: The equivalence of Definitions 7.4 and 7.5 can be shown. See textbook.