

**Definition 11.2 (Continuous Channel II)** Let  $\alpha : \Re \times \Re \rightarrow \Re$ , and  $Z$  be a real random variable, called the noise variable. A (discrete-time) continuous channel  $(\alpha, Z)$  is a system with a real input and a real output. For any input random variable  $X$ , the **noise random variable  $Z$  is independent of  $X$** , and the output random variable  $Y$  is given by

$$Y = \alpha(X, Z).$$