

- Input random variable X takes values in discrete alphabet \mathcal{X} .
- Output random variable Y takes values in discrete output alphabet \mathcal{Y} .
- The channel is specified by a transition matrix $p(y|x)$ from \mathcal{X} to \mathcal{Y} .
- Input-output relation:

$$\Pr\{X = x, Y = y\} = \Pr\{X = x\} p(y|x)$$

- BSC with crossover probability ϵ :

$$[p(y|x)] = \begin{bmatrix} 1 - \epsilon & \epsilon \\ \epsilon & 1 - \epsilon \end{bmatrix}$$