

**Definition 7.3** Two discrete channels  $p(y|x)$  and  $(\alpha, Z)$  defined on the same input alphabet  $\mathcal{X}$  and output alphabet  $\mathcal{Y}$  are equivalent if

$$\Pr\{\alpha(\textcolor{red}{x}, Z) = \textcolor{blue}{y}\} = p(\textcolor{blue}{y}|\textcolor{red}{x})$$

for all  $\textcolor{red}{x}$  and  $\textcolor{blue}{y}$ .