

Definition 11.3 Two continuous channels $f(y|x)$ and (α, Z) are equivalent if for every input distribution $F(x)$,

$$\Pr\{X \leq \textcolor{red}{x}, \alpha(X, Z) \leq \textcolor{blue}{y}\} = \int_{-\infty}^{\textcolor{red}{x}} \int_{-\infty}^{\textcolor{blue}{y}} f_{Y|X}(v|u) dv dF_X(u)$$

for all x and y .