

$$\begin{aligned}
nR &= H(W) \\
&= I(W; \hat{W}) + H(W | \hat{W}) \\
&\leq I(W; \hat{W}) + n\epsilon_n \\
&\leq I(X^{(n)}; Y^{(n)}) + n\epsilon_n \\
&= h(Y^{(n)}) - h(Y^{(n)} | X^{(n)}) + n\epsilon_n \\
&= h(Y^{(n)}) - h(Z^{(n)}) + n\epsilon_n \\
&\leq \sum_{i=1}^n Y_i - h(Z^{(n)}) + n\epsilon_n \\
&\leq \sum_{i=1}^n I(X_i; Y_i) + n\epsilon_n
\end{aligned}$$