

The [separation theorem for source and channel coding](#) has the following engineering implications:

- asymptotic optimality can be achieved by separating source coding and channel coding
- the source code and the channel code can be designed separately without losing asymptotic optimality
- only need to change the source code for different information sources
- only need to change the channel code for different channels

Remark For finite block length, the probability of error generally can be reduced by using joint source-channel coding.