

Shannon's Theorem on Channel Capacity

(Shannon's Second Theorem)

Positive Statement

Shannon's theorem on channel capacity

states that "when the rate of information transmission $R_t \leq C$, then there exists a coding technique which enables transmission over a channel with as small a probability of error as possible, even in the presence of noise in the channel".

This theorem indicates that for $R_t \leq C$, error of information is achieved ~~there~~ without errors, even in the presence of noise.

This is analogous to amp. modulation with 'm' as the mod. index defined as ratio of peak value of modulating voltage to peak value of carrier voltage.

As long as $m \leq 1$, error of modulated signal is possible without error. But when ~~not~~

$m > 1$, txion is possible but there will be errors introduced due to over-modulation and there will be loss of information.

Negative Statement

If $R_t > C$, then reliable txion of information is not possible without error. Thus when $R_t > C$ then the errors cannot be controlled by any coding technique and the probability of error of receiving the correct message becomes close to unity.

