

Studied Paper

- Channel Capacity in Bits Per Joule. HYUCK M. KWON and THEODORE G. BIRDSALL

Main idea

- How to efficiently use the energy that stored in the transmitters is important.
- Define $C_J = C(\text{channel capacity})/S(\text{channel average power})$ to calculate energy efficiency

Some Channel Models

- For incoherent BFSK channel, C_f max is achieved when E_s (symbol energy) = 3.084 N_0
- For Coherent BFSK channel, C_f max is achieved when E_s/N_0 is very small
- For distorted waveform channels, C_f max is achieved when S (channel average power) is very small. And the paper suggest that we should picks narrow band with highest local SNR.

Further Subjects

- According to the last channel model and its suggestion for energy distribution, we would like to test some other channel models to see if it holds.
- Compare new method to water filling method.
- Try using new method to achieve energy efficiency with constrain C (channel capacity) must bigger than R (code rate)