

Modeling and Simulation of Turbo Encoder and Decoder for Wireless Communication Systems

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Error Control Coding

- Add redundant information which can be detected and corrected
- Performance metrics :
 - Bit Error Rate (BER)
 - Signal to Noise Ratio (SNR)
- For a fixed BER, SNR requirement is reduced (Coding Gain)

Turbo Codes

- Capable of achieving near Shannon capacity
- Binary parallel concatenated recursive systematic convolution code
- Low complexity encoding and decoding algorithms

Berrou, C., Glavieux, A. and Thitimajshima, P., i “Near shannon limit error-correcting coding and decoding: turbo codes”, 1993

Proposed Work

- Fixed point implementation of Turbo encoder and decoder on TMS320C6711 DSK
- Use MAP algorithm for decoding (CDMA 2000)
 - Advantage : Higher coding gain at low SNR
 - Disadvantage : More computationally and memory intensive
- Enhancements
 - Sliding window
 - MAX* approximation