Iterative Demodulation and Turbo Decoding for Distributed Radio Receivers*

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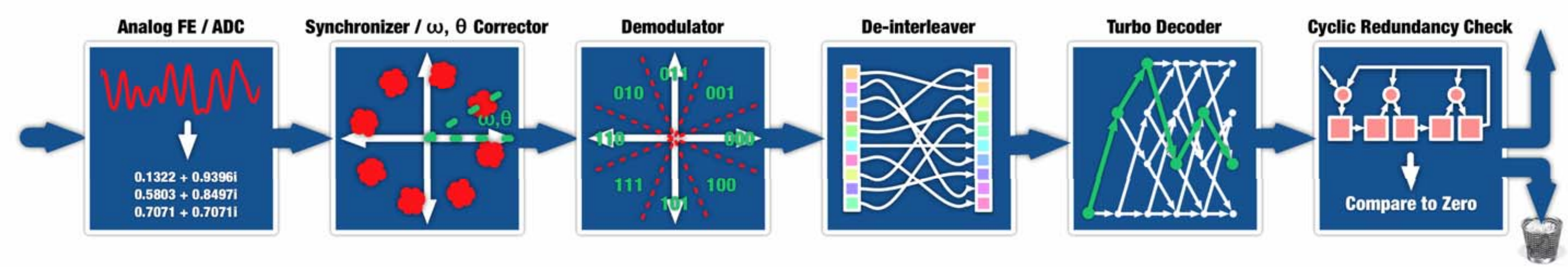
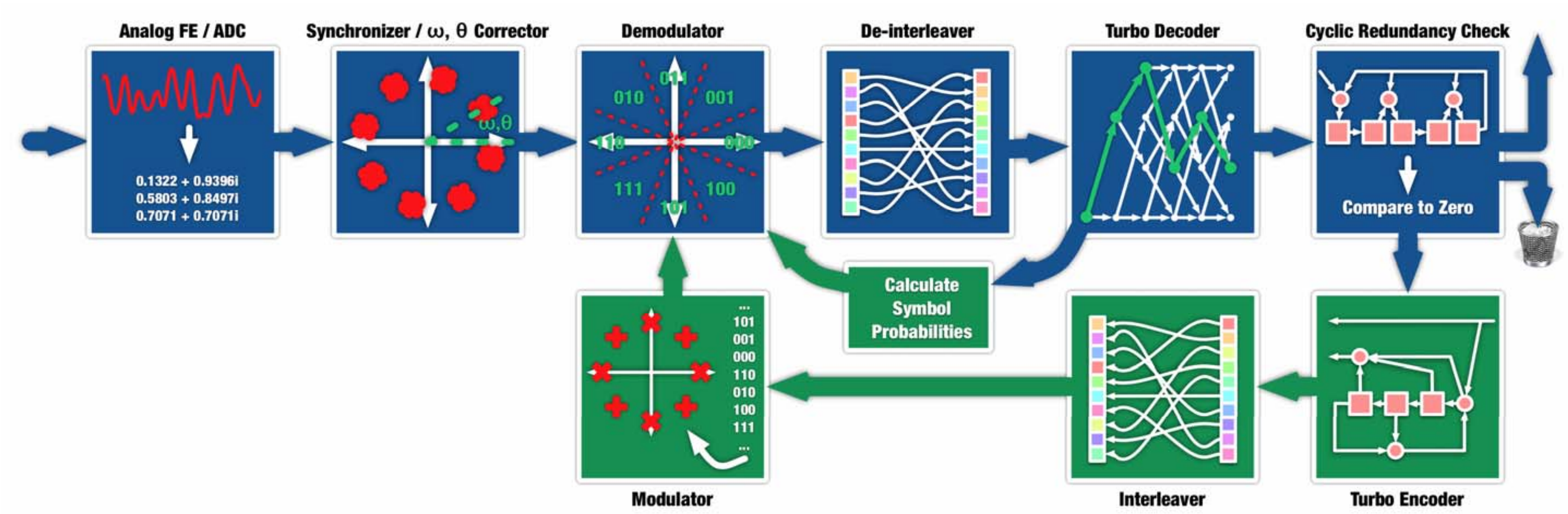
Baseline Receiver Chain



- Turbo Decoding is the most taxing component in the receiver
- For example, a 802.11g-like receiver with a 16 Kb packet would require:
  - Operations: 1424 Ops/bit
  - Throughput: 24 MOps per packet, 77 GOps per sec
  - Minimum Latency: 6 msec (on 4 GOPS GPU)
- And, for a 1 Kb packet
  - Operations: 1424 Ops/bit
  - Throughput: 1.4 MOps per packet, 77 GOps per sec
  - Minimum Latency: 0.4 msec a 16 × improvement (on 4 GOPS GPU)

- However, 1 Kb packets do not provide an acceptable BER

Iterative Receiver Chain



- **At sufficient SNRs, iterative processing reduces BER with a minimal increase in computation**

- **On a parallel computer with iterative processing, latency is reduced with the shorter packet length while maintaining similar BER performance**

Study Questions

- **How does packet length affect latency, throughput, and BER?**
- **How does iterative demodulation and decoding affect latency, throughput, and BER?**

We performed parametric study which varied:

- **Iterations**
- **Packet Length**
- **Signal to noise ratio**
- **Coder strength**

The answers to these questions can be seen on the poster.