

Turbo code performance

Kalle Ruttik

Communications Laboratory
Helsinki University of Technology

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Performance of Turbo Decoding algorithms

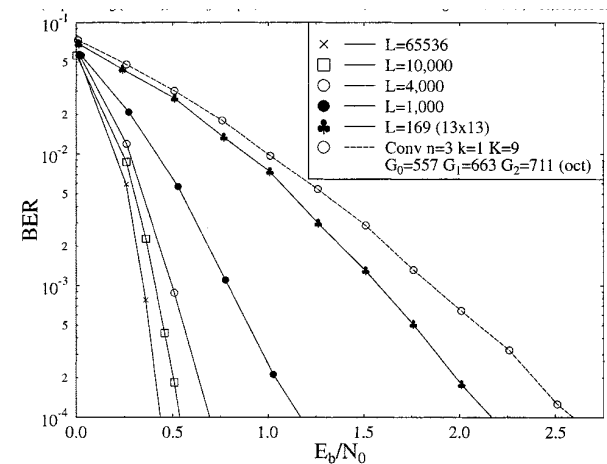
Turbo code performance depends on:

- Amount of component codes
- Component code decoding algorithms
- Number of iterations used
- Frame length
- Interleaver type: random, nonrandom
- Channel reliability values

Codeword length

- Longer interleaver better - longer codeword
- Interleaver gain due to the lower amount of near neighbours
- Random interleaver
- Problems: loops in the code, neighbouring bits not independent small loops in the code
- Small loops dominate the erroneous paths
- High error floor

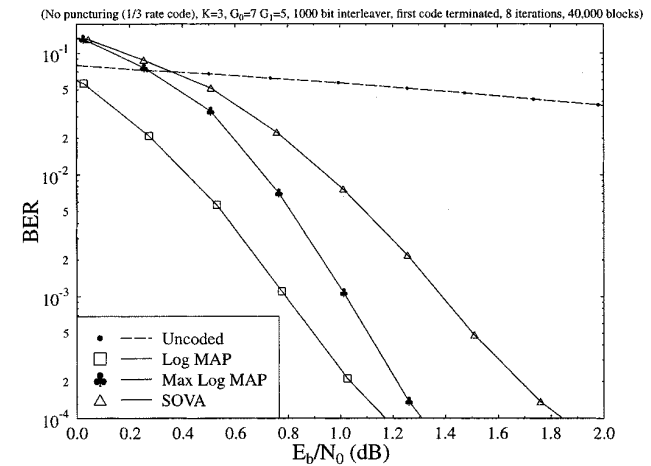
Decoder performance as a function of the interleaver length



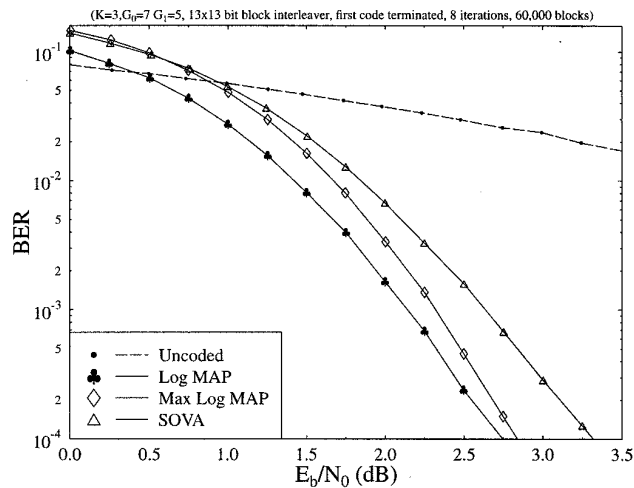
Different amount of codewords

- Keep the coderate the same
- add more component encoders $\Rightarrow$ lower rate per codeword
- Good error floor properties
- Need more iterations for decoding

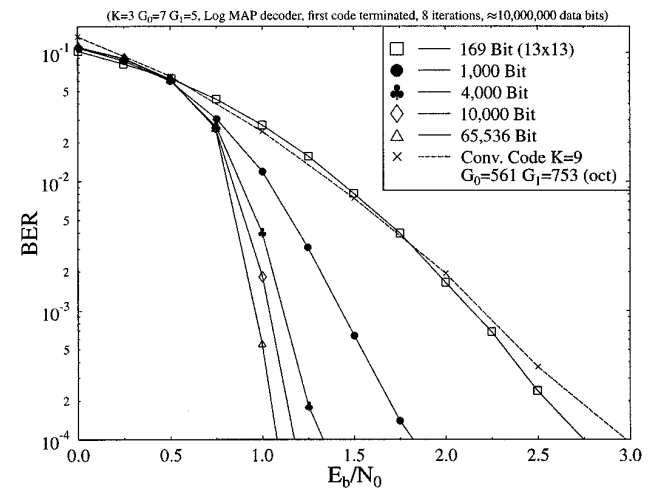
Performance dependence on decoding algorithm: long codeword



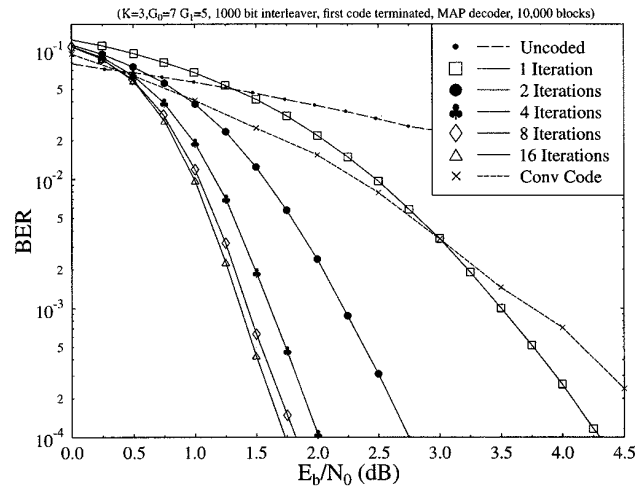
Performance dependence on decoding algorithm: short codeword



Dependency on codeword length



Amount of iterations



References

- 1 J. Woodland, L. Hanzo. "Comparative study of turbo decoding techniques: an overview", IEEE Trans. on Veh. Tech., vol. 49. no. 6. Nov. 2000., page 2208-2233.