

Modeling BLER Performance of Punctured Turbo Code $(13,15)_8$ Adopting QPSK and 16QAM Modulations

Sergio Lembo, Kalle Ruttik, Olav Tirkkonen

Department of Communications and Networking
Helsinki University of Technology (TKK)
P.O. Box 3000, FI-02015 TKK, Finland

Abstract

In this presentation we propose a set mathematical models that predict the BLock-Error-Ratio (BLER) performance of the turbo code $(13,15)_8$ considering QPSK and 16QAM modulations. The performance can be predicted for any Signal-to-Noise-Ratio (SNR) value, block length, and modulation-coding scheme rate. The proposed models provide an easy way to predict link level performance for network level analysis. The models are represented by a continuous and differentiable function and can be used along with optimization techniques in network level optimizations.

The presentation begins explaining the difference between *link* and *network level* models and then presenting the need to have a mapping between SNR and BLER.

Then a general function relating the variables in use will be presented.

A brief explanation and figure of a Turbo Code is then presented along with other system details.

The derivation of the desired model follows, and it is explained with the aid of figures in order to make the presentation easy to follow for people not involved in the field of channel coding.

The presentation concludes with easy-to-understand figures comparing BLER curves obtained by simulation and curves obtained with our model.

Index Terms: Turbo codes, BLER, network level model, link level model model.

Categories:

- Design and optimization of emerging wireless network technologies
- Modern air interfaces and protocols