AFF3CT: A Fast Forward Error Correction Toolbox
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Simulation of digital communications (5G, Wi-Fi, DVB-RCS, etc.)

− Monte Carlo method: embarrassingly parallel problem

Toolbox for Forward Error Correction (FEC) class of algorithms

High throughput simulations: optimized and parallel C++ source code (SIMD, multi-threading, multi-node)

Algorithmic heterogeneity: codes (polar, LDPC, turbo, BCH, RS, etc.), modems (PSK, QAM, CPF, SCMA, etc.), channels

Reproducible science: state-of-the-art simulation results, portable (Windows, macOS, Linux), open source (MIT license)

High Throughput Simulations

A (2048,1723) polar code is simulated with a BPSK modem and over an AWGN channel (FA-SCL decoder, \( L = 32 \), BER @ 4.34e-10 [1]).

Bit/frame error rate decoding performances of polar [1] and turbo [2] codes depending on the Signal-to-Noise Ratio (SNR), lower is better.

Many parameters can be evaluated to explore new trade-offs

Documentation available online (installation + simulator usage)

Come with a bank of pre-simulated state-of-the-art references

Code validated over a complete continuous integration pipeline

REFERENCES


CONTACT

COMMUNITY & COLLABORATIONS

Collaboration between Inria and IMS labs

External academic contributors

Industrial users and collaborators

− Airbus − Thales

− Schlumberger − Huawei

− TurboConcept − Orange Labs

FEC software decoders Hall of Fame (polar, LDPC and turbo)

Source code on GitHub: https://github.com/aff3ct

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