

Course Work

This is the course work requirement. You should design a convolutional code and its hard-decision and soft-decision Viterbi decoders using the given Program Template as the follows.

- (1) Program a convolutional encoder;
- (2) Program hard-decision and soft-decision Viterbi decoders;
- (3) Simulate your program and obtain the bit error rate (BER) performance against the channel signal-to-noise ratio (SNR). (You can use excel or matlab to generate the figure.)
- (4) * Repeat (3) by programing a BCJR decoder.
- (5) * Repeat (3) by programing a Turbo encoder and decoder.

Note that (4)* and (5)* are optional based on your progress and its accomplishment will gain you merit.

BER: the ratio of error message bits to the total transmitted message bits.

SNR: In the AWGN channel, $y = x + n$ and $n \sim N(0, \sigma^2)$. $\text{SNR} = E_b/N_0$, where E_b is the energy per message bit and $N_0 = 2\sigma^2$.

If you have any question, please contact us via e-mail: liangjw59@mail2.sysu.edu.cn or yangzhj59@mail2.sysu.edu.cn.