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Error floor

The **error floor** is a phenomenon encountered in modern iterated <u>sparse graph</u>-based <u>error correcting codes</u> like <u>LDPC codes</u> and <u>turbo codes</u>. When the <u>bit error ratio</u> (BER) is plotted for conventional codes like <u>Reed–Solomon codes</u> under algebraic decoding or for <u>convolutional codes</u> under <u>Viterbi decoding</u>, the BER steadily decreases in the form of a curve as the <u>SNR</u> condition becomes better. For LDPC codes and turbo codes there is a point after which the curve does not fall as quickly as before, in other words, there is a region in which performance flattens. This region is called the *error floor region*. The region just before the sudden drop in performance is called the *waterfall region*. [1]

Error floors are usually attributed to low-weight codewords (in the case of Turbo codes) and trapping sets or near-codewords (in the case of LDPC codes).^[2]

References

- 1. Ryan, W. E. and Lin, S.: Channel Codes: Classical and Modern, Cambridge University Press
- 2. Thomas Richardson: Error floors of LDPC codes. http://ldpccodes.com/papers/ErrorFloors.pdf

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