

# Obligatory Exercise

## Error rates and error probabilities

Hans Georg Schaathun

due date Monday 2 February 2015, 8:15am

### Main question:

*What is the decoding error probability of the [31, 11] BCH code used on a BSC with bit error probability  $p_e$ ?*

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**Submission method** on paper, in the pigeon hole of Hans Georg Schaathun on B3. E-mail submission is acceptable **only as a single PDF file**.

### Contents of Submission

1. Front page with name, date, and module title.
2. A short essay answering the main question above with justification and discussion, based on your own simulations. Expectations are detailed below. This essay must not exceed 2000 words.
3. Optionally you may include appendices with source code, execution transcripts, data sets, etc.

**Additional material** m-files for the encoder/decoder of the given code can be found on the module web page.

During the five exercise sheets for the classroom session, we have explored a similar problem, just with a different code. You should reuse analysis techniques and source codes from those exercises.

You have to simulate the coding system and arrive at a point estimate for the decoding error probability. The essay has to explain how you do this.

You will also need to calculate the standard error of your estimator, and explain what this means in practice. What can you confidently say about the decoding error probability for the purpose of practical application?

Optionally, you may discuss confidence intervals for the decoding error probability.