Using the OpenFEC.org Library: a Simple User Guide

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1 Introduction

This document is a user guide meant to facilitate the use of the OpenFEC.org library. It is recommended for developpers that need to integrate one or several codecs within their own application.

1.1 Important Files

The various methods of the API are defined in file `src/lib_common/of_openfec_api.h`. This is the main file and *the only one that needs to be included by any application.*

In addition, to accomodate code and codec specificities, additional API files are defined. For instance, with the LDPC-staircase codec, the `src/lib_stable/ldpc_staircase/of_ldpc_staircase_api.h` file defines additional specificities. This file (and the similar ones for the other codecs) are automatically included.

2 Main concepts

2.1 Codec identification: of_codec_id

The various codecs are identified by means of a constant:

```
typedef enum
{
        OF_CODEC_NIL = 0,
        OF_CODEC_REED_SOLOMON_GF_2_8_STABLE = 1,
        OF_CODEC_REED_SOLOMON_GF_2_M_STABLE = 2,
        OF_CODEC_LDPC_STAIRCASE_STABLE = 3,
        OF_CODEC_2D_PARITY_MATRIX_STABLE = 5,
        OF_CODEC_LDPC_FROM_FILE_ADVANCED = 6,
[...]
} of_codec_id_t;
```

Since several codecs may implement the same code, for instance using different algorithms, the constant identifies first of all a codec, which provides an implementation of a class of codes.

3 LDPC from file codec

The LDPC from file codec requires that the LDPC code be specified in a separate file whose format is the following:

```
number of rows
number of columns
number of source symbols
number of repair symbols
line_x1 col_y1 col_y2 col_y3 ...
line_x2 col_y1 col_y2 col_y6 ...
```

You only write 1 entries.
Example for a k=10, r=10 matrix :

```
 10
 20
 10
 10
     0          0          1          3          4          5          10
```

1	2	3	6	7	8	10	11
2	2	5	6	7	9	11	12
3	3	4	6	8	9	12	13
4	4	5	6	8	9	13	14
5	0	1	4	5	8	14	15
6	0	2	4	7	8	15	16
7	0	1	3	5	7	16	17
8	1	2	3	6	9	17	18
9	0	1	2	7	9	18	19