

# 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 developers 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