Open Optical Networks - The Spectral Information

Exercise 0

Install GNPy

1. Download or clone GNPy `https://github.com/Telecominfraproject/oopt-gnpy`
2. Open the Terminal of PyCharm
3. Navigate to the GNPy folder 'oopt-gnpy'
4. Install GNPy running the commant `python setup.py install`

Exercise 1

Create the spectral information

1. Create a json file with the following parameters (in fundamental units, Hz, Baud, W):
   - "f_min" = 191.5 THz,
   - "f_max" = 194.5 THz,
   - "roll_off" = 0.2,
   - "baud_rate" = 32 GBaud,
   - "power" = 1 mW,
   - "spacing" = 50 GHz
2. Import the json file. *Hint*: use the python library 'json'.
3. Generate a spectral information.
   Hint 1: use the function `create_input_spectral_information` available in the GNPy library. You can find `create_input_spectral_information` in `gnpy.core.info`.
   Hint 2: This function requires, as input the following parameters: f_min, f_max, roll_off, baud_rate, power, spacing. You can also use the python function `help` to see the arguments of a function.

1 Exercise 2

Plot the spectral information

- Use `matplotlib` to produce a plot containing the signal power of the spectral information previously described as follows:

- it has to be a dotted line. If a reference is needed see `https://matplotlib.org/3.1.1/api/_as_gen/matplotlib.pyplot.plot.html`,
- the x axis must be the frequency axis in THz units,
- the y axis must contain the signal power of all the channels of the WDM comb. The power has to be reported in dBm units.
- use axis labels and report the unit of measurement used

2 Exercise 3

Create and plot a spectral information representing a comb of 120 WDM channels. Each channel has a -3 dB bandwidth of 32 Gbaud, a roll-off of 0.2 and a power equal to 0 dBm. This comb is centered around 193 THz and the spacing is 45 GHz.
Hint: Remember that, for root raised cosine signals, the - 3 dB bandwidth coincide with the symbol rate of the signal.