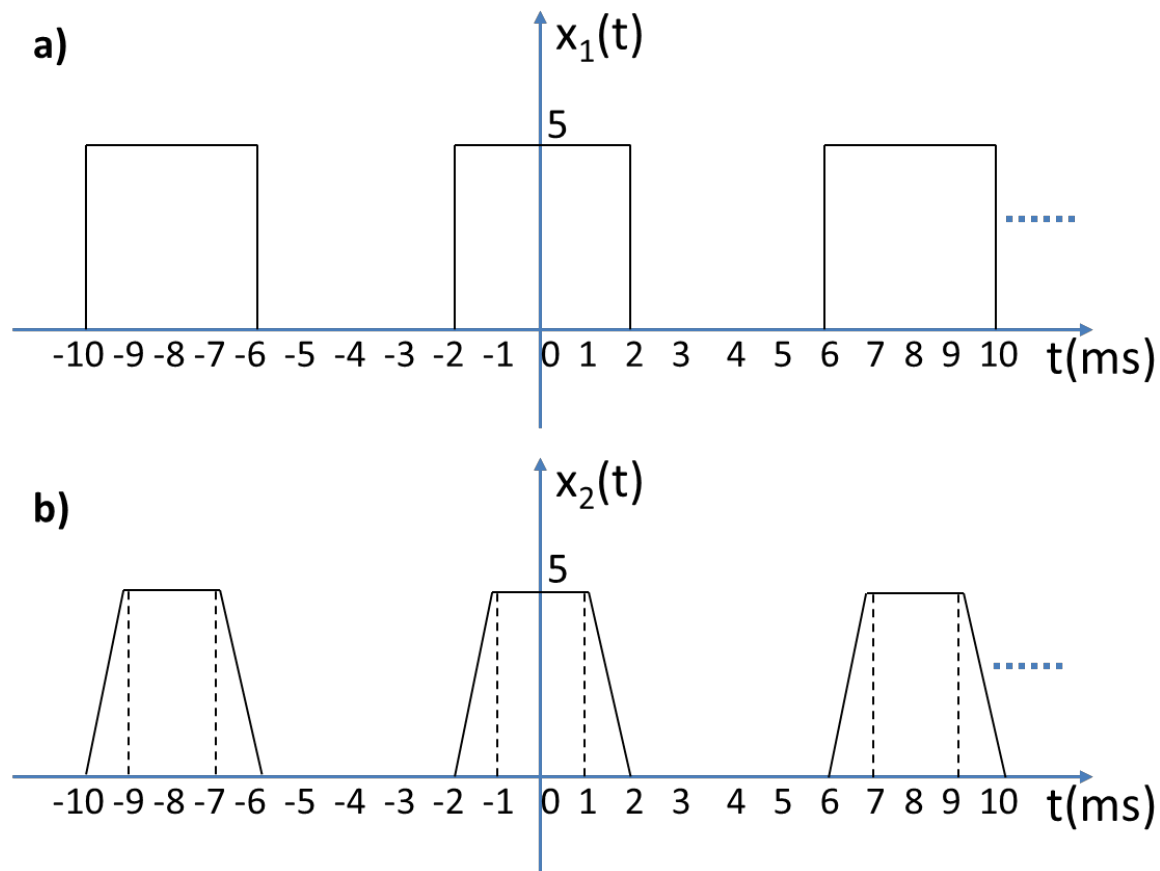


Signals and Systems for Computer Engineering

HOMework 2

Due: 17.04.2019 – 23:59

$x_1(t)$ and $x_2(t)$ are two continuous time signals and their periods are equal as shown below in the figure (a) and (b) for two cases depending on limitation of rise and fall times.



In this homework, you are required to write two Python (version 3.7.x) scripts:

- **harmonics.py**: Plots both signals' non-zero harmonics in an additive manner up to first five components as H_1 , H_1+H_2 , $H_1+H_2+H_3$, $H_1+H_2+H_3+H_4$, $H_1+H_2+H_3+H_4+H_5$. This script will receive two arguments, the signal name (x_1 or x_2) and the number of harmonics (up to 5).

Example run:

```
>> python harmonics.py x1 1      # will plot H1 for the signal x1
```

```
>> python harmonics.py x2 3      # will plot H1+H2+H3 for the signal x2
```

- **thd.py**: Calculates % THD (Total Harmonic Distortion) for both cases.

Example run:

```
>> python thd.py x1    # will print THD for the signal x1
```

```
>> python thd.py x2    # will print THD for the signal x2
```

In your report, you will:

- show all the plots for the signals x1 and x2 (totally 2x5=10 plots).
- give THDs (%) for both signals, compare these values and add comments about why one is larger or smaller than the other.

IMPORTANT NOTES:

- ➔ You are asked to upload only 3 files in your zip file (2 .py files and 1 .pdf file). PLEASE don't send any other file.
- ➔ Put all your outputs (plots, charts, etc.) in a report file.
- ➔ Give a brief explanation of your code in your report.
- ➔ Use comment outs on the necessary lines in your code **AND** put your name and number at the top of your code.
- ➔ As a third grade student, please type your code orderly **AND** write your report tidy.
- ➔ Don't put fancy covers in your report, name and number at the left-top corner would be enough.
- ➔ **The code you typed must WORK (as the manner of syntax). Otherwise you will get zero point for that homework. The Teaching Assistants won't fix or debug your code to get it work.**