



UNIVERSITY OF LIÈGE

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## Frequency domain

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Linear control systems

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Master in Civil Engineering  
Academic year 2019-2020

## 1 Framework

Our model has not been updated.

## 2 Constraints and simulation specifications

We have the following constraints :

- Acceleration of the mass damper between  $0.3$  and  $0.6g$ , as advised by Prof. Denoël.
- Power injected in the mass of below  $10\text{ kW}$  so as to not have too much electrical consumption.
- Lateral movement of the top of the building not above  $1\text{ m}$ .

The scenario we look at is the following : A turbulent wind of maximum  $7.35\text{ MN}$ , that we represented as a sine function.

### 2.1 Choice of cross-over frequency

The frequency of our damper is computed via :  $f = \sqrt{\frac{k}{m}} \approx 10\text{ Hz}$ . We will therefore use a crossover frequency of  $20\text{ Hz}$ , so all frequencies above that, probably coming from noise and unwanted phenomena, will be attenuated, while the amplitudes of the frequencies below that, which correspond to the internals of our system, will be amplified.

## 3 Loop shaping

to do

## 4 Gang of four

to do

## 5 Delays through the controller design

to do