Rheometer - Dynamic compression

Petrus N Kirsten

Advisors:

Prof. Dr. Ana Paula Ramos — *Universidade de São Paulo, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto*

Prof. Dr. Bianca Chieregato Maniglia — *Universidade de São Paulo, Instituto de Química de São Carlos*

Prof. Dr. Pedro Esteves Duarte Augusto — *Université Paris-Saclay, CentraleSupélec, Centre Européen de Biotechnologie et de Bioéconomie*

Automated algorithm to plot graphs directly from the .csv file exported from the rheometer software.

The developed algorithm aims to automate the plotting of graphs exported by the rheometer's native software.

This is a Python package that calls a function according to the intended analysis:
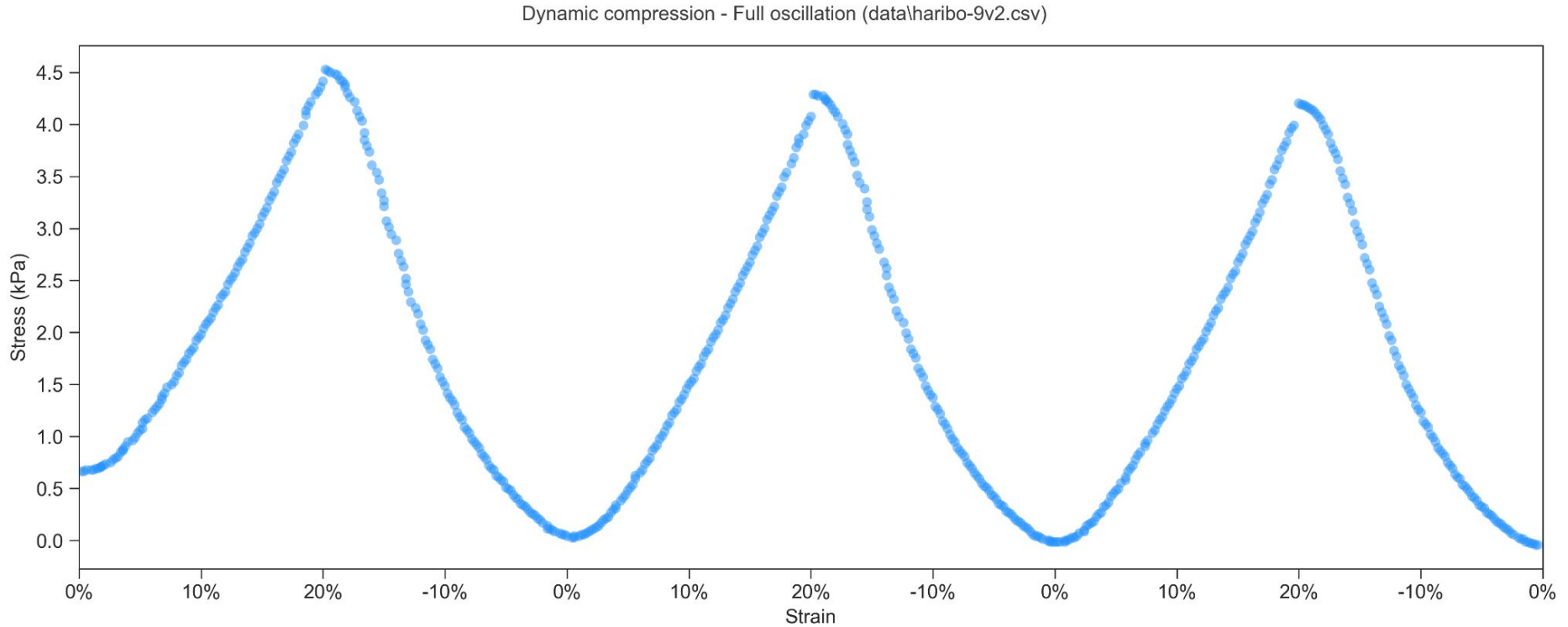
- Total oscillation (plots the oscillation graph over the entire experiment); or
- Individual oscillations (plots each overlapping oscillation to assess variation over time).

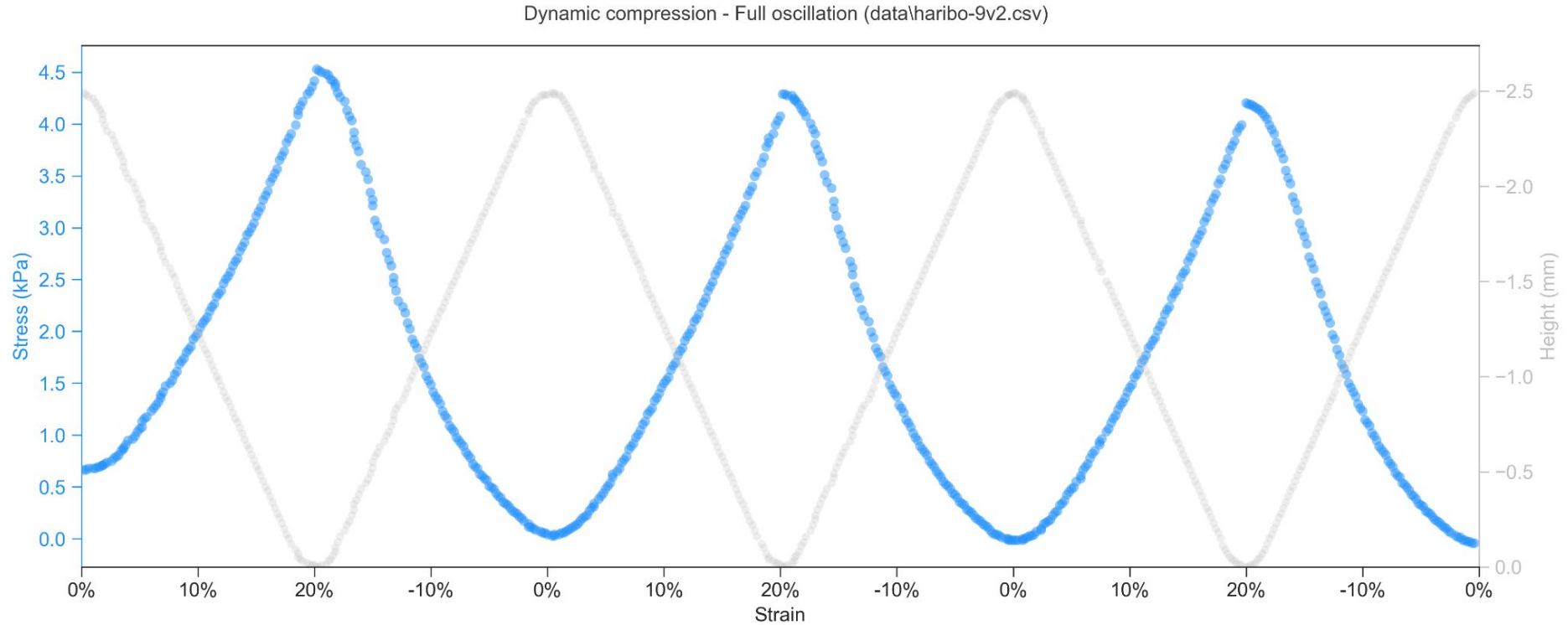The functions have different optional parameters to better customize the output plot.

	A	B	C	D	E
1	SegIndex	Fn in N	h in mm	t in s	t_seg in s
2	1|1	0.47	12.48	0.01	0.01
3	1|2	0.47	12.47	0.02	0.02
4	1|3	0.48	12.46	0.03	0.03
5	1|4	0.48	12.45	0.05	0.05
6	1|5	0.48	12.43	0.06	0.06
7	1|6	0.49	12.41	0.07	0.07
8	1|7	0.49	12.39	0.08	0.08
9	1|8	0.50	12.37	0.09	0.09
10	1|9	0.50	12.34	0.09	0.09
11	1|10	0.51	12.31	0.10	0.10
12	1|11	0.52	12.28	0.11	0.11
13	1|12	0.53	12.26	0.13	0.13
14	1|13	0.55	12.23	0.14	0.14
15	1|14	0.56	12.20	0.15	0.15
16	1|15	0.57	12.17	0.16	0.16
17	1|16	0.60	12.15	0.17	0.17
18	1|17	0.61	12.12	0.18	0.18
19	1|18	0.62	12.09	0.18	0.18
20	1|19	0.64	12.06	0.19	0.19
21	1|20	0.67	12.03	0.20	0.20

.csv file exported from rheometer software.

Dynamic compression - Full oscillation (data\haribo-9v2.csv)

Total oscillations | Stress X strain plot with experimental height.
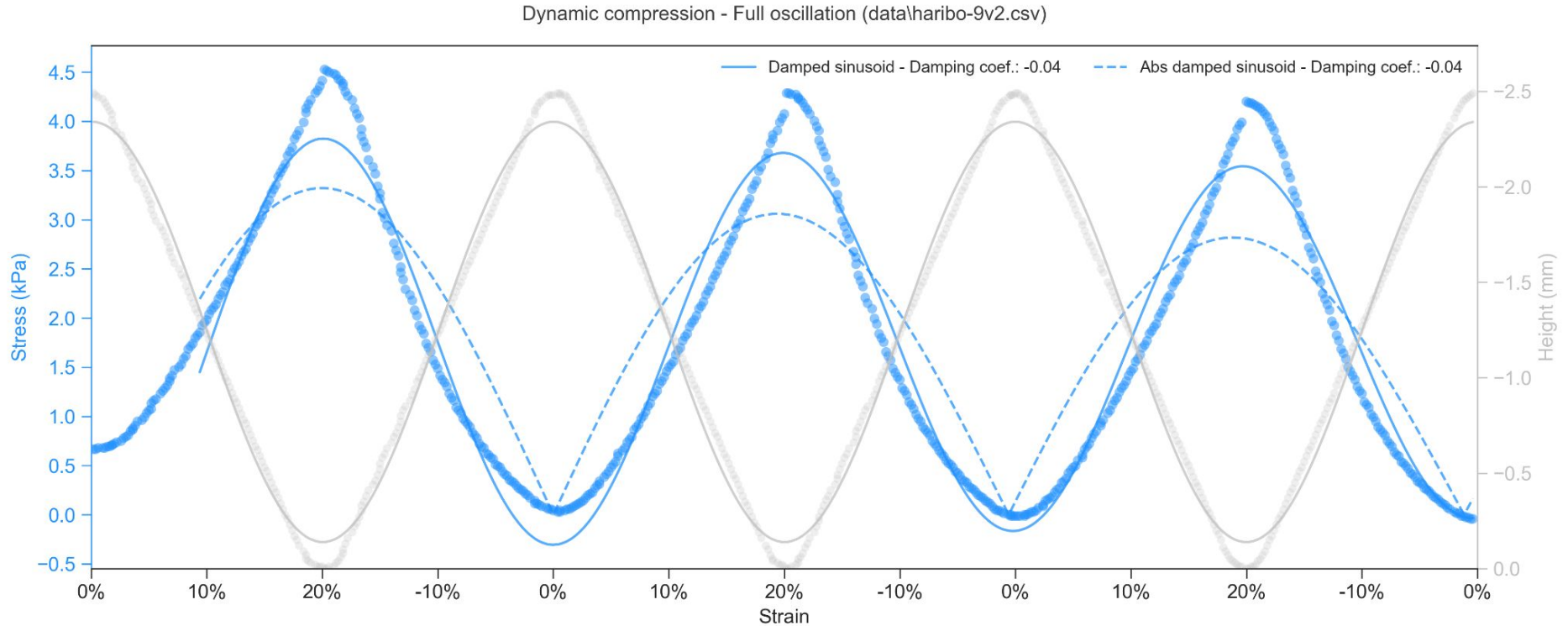
Dynamic compression - Full oscillation (data\haribo-9v2.csv)

Dynamic compression - Full oscillation (data\haribo-9v2.csv)

Dynamic compression - Full oscillation (data\haribo-9v2.csv)

Dynamic compression - Cycle analysis (data\haribo-9v2.csv)
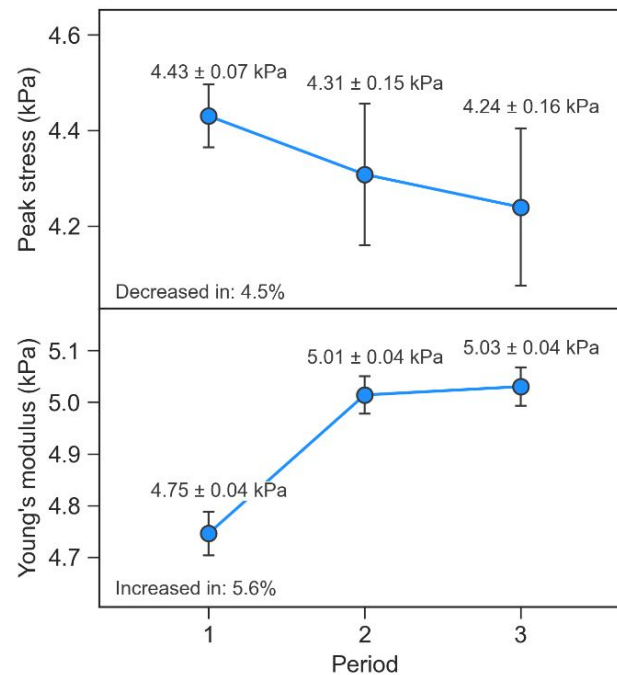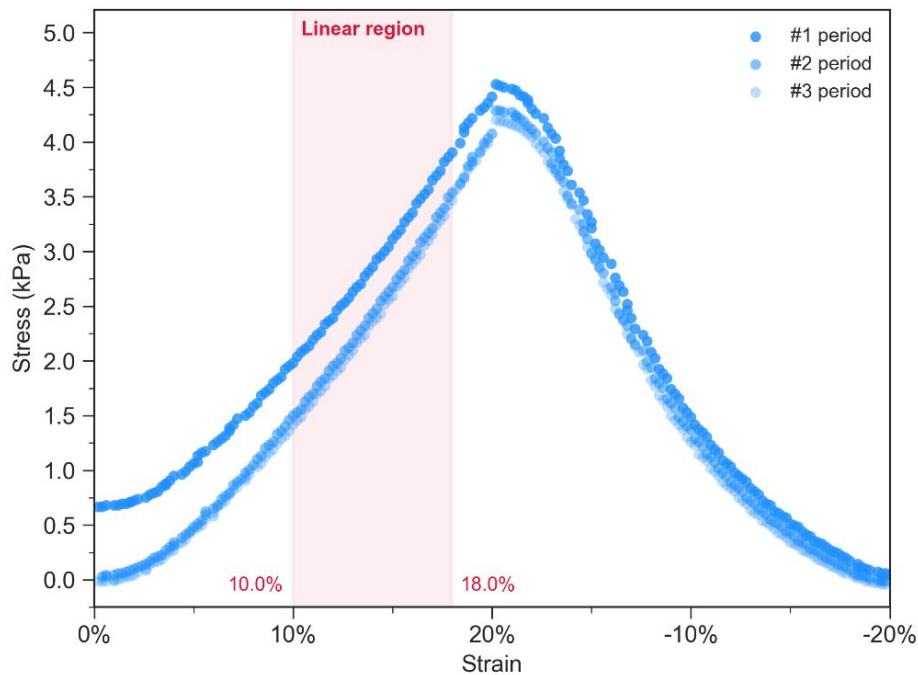
Individual oscillations | Stress X strain plot. Peak and Young's Modulus analysis.
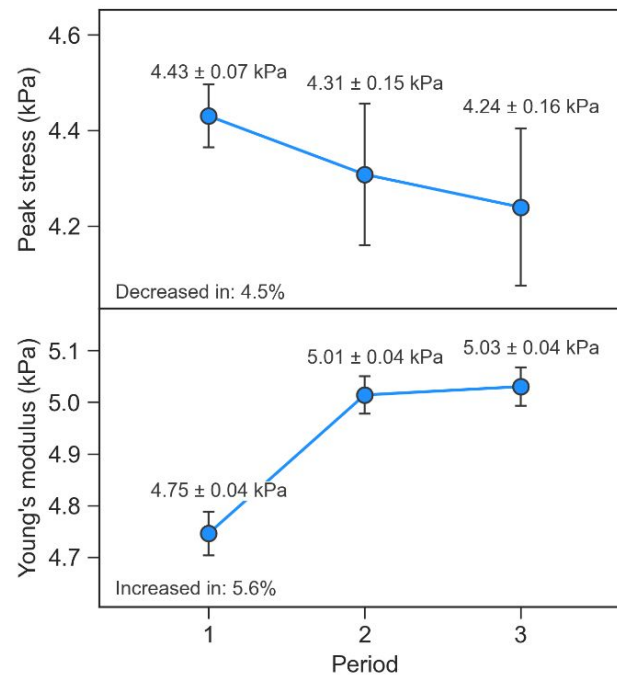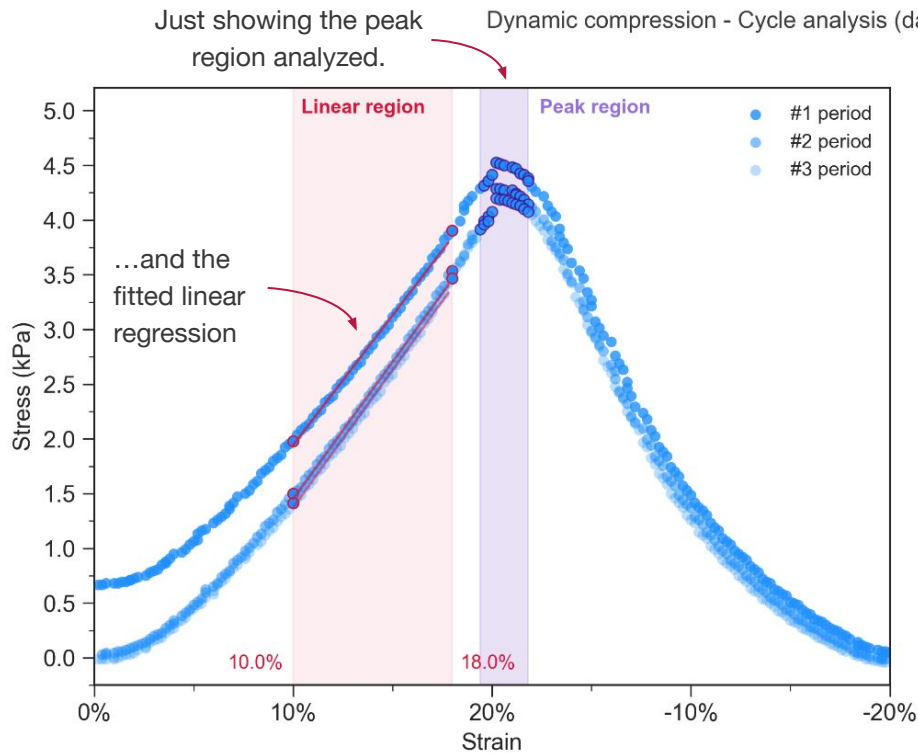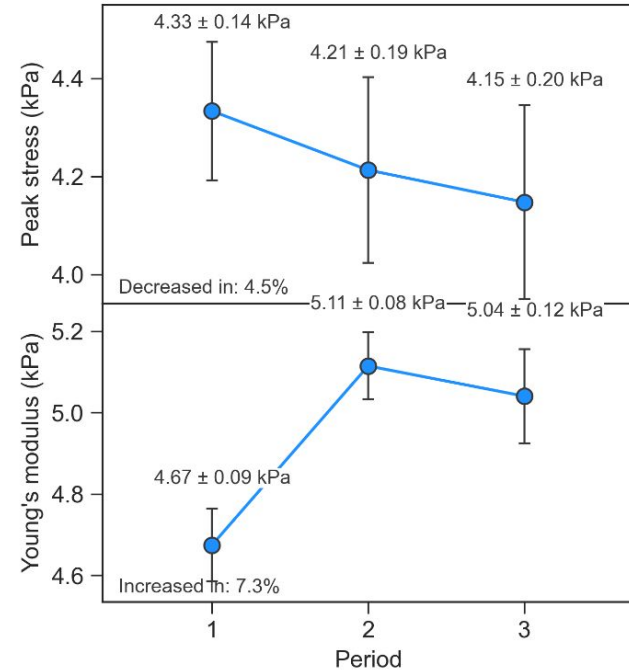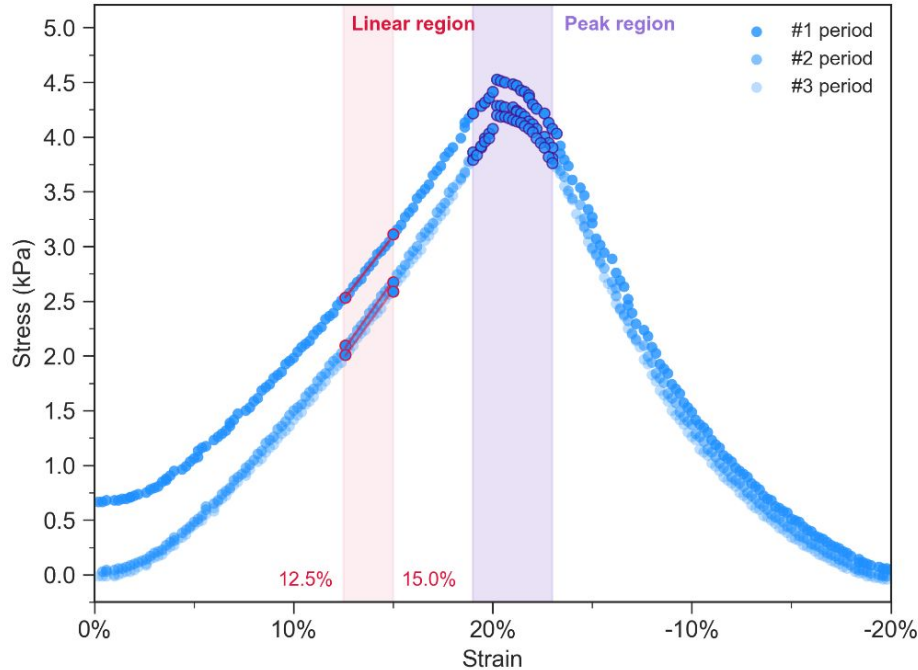
Individual oscillations | Stress X strain plot. Peak and Young's Modulus analysis.

It is possible to change the linear and peak region by passing different arguments to the function

Dynamic compression - Cycle analysis (data\haribo-9v2.csv)

Oscillation amplitude | Determine the amplitudes for the experiment.

Discovering the amplitude of descent and ascent was not so trivial. Therefore, I developed a function to discover the values and selected, in the amplitude region of interest, the most "round" values.