

N.^o 02

Automating a beam with Python, from scratch

We have all computed a simply supported beam by hand. In this first part we move it to Python, line by line, and see what a calculator cannot do: compute twenty beams in one second.

1.

The usual beam

Simply supported, distributed load w and a point load P at midspan. We solved it a thousand times at university.

2.

The formulas

$M = wL^2/8 + PL/4$. $V = wL/2 + P/2$. Deflection
 $= 5wL^4/384EI + PL^3/48EI$.

3.

In Python

6 lines

A function that takes L , w , P and EI and returns moment, shear and deflection.

4.

What a calculator cannot do

×13

If the span goes from 4 to 8 m, deflection grows 13 times. With the script you see it in a table.

5. Next

Part 2: moment and shear diagrams for any load combination.

Full note, with equations and tables, at the link on my profile.

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