

Project 2

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Github repository: <https://github.com/Fslippe/FYS4150/tree/main/project2>

Second order differential equation describing our buckling beam situation:

$$\gamma \frac{d^2 u(x)}{dx^2} = -Fu(x) \quad (1)$$

Troughout this project we will be working with the scaled equation:

$$\frac{d^2 u(\hat{x})}{d\hat{x}^2} = -\lambda u(\hat{x}) \quad (2)$$

Where $\hat{x} \equiv x/L$ is a dimensionless variable, $\hat{x} \in [0, 1]$ and $\lambda = \frac{FL^2}{\gamma}$.

PROBLEM 1

Using the defenintion $\hat{x} \equiv x/L$ to show that Eq. 1 can be written Eq. 2.

$$\begin{aligned} \gamma \frac{d^2 u(x)}{dx^2} &= -Fu(x) \\ \frac{d^2 u(x)}{dx^2} &= -\frac{F}{\gamma} u(x) \end{aligned}$$

PROBLEM 2

PROBLEM 3

PROBLEM 4

PROBLEM 5

PROBLEM 6