

Title of the document

Your name(s) here
(Dated: September 3, 2021)

<https://github.com/henrikbreitenstein/FYS3150.git>

PROBLEM 1

Poisson equation

$$-\frac{d^2u}{dx^2} = f(x)$$

Replacing $f(x)$ with given function

$$\begin{aligned} -\frac{d^2u}{dx^2} &= 100e^{-10x} \\ -d^2u &= 100e^{-10x} dx^2 \end{aligned}$$

Taking integrals

$$\begin{aligned} -\int \int d^2u &= \int \int 100e^{-10x} dx^2 \\ -u &= \int -10e^{-10x} + c_1 dx \\ -u &= e^{-10x} + c_1x + c_2 \\ u &= -e^{-10x} - c_1x - c_2 \end{aligned}$$

Using initial conditions:

$$u(0) = 0 \Rightarrow -1 - c_2 = 0 \tag{1}$$

$$u(1) = 0 \Rightarrow -e^{-10} - c_1 - c_2 = 0 \tag{2}$$

With 1 and 2 we get:

$$\begin{aligned} c_2 &= -1 \\ c_1 &= 1 - e^{-10} \end{aligned}$$

By replacing c_1 and c_2 we get:

$$u = 1 - (1 - e^{-10})x - e^{-10x} \tag{3}$$

PROBLEM 2

Finally, we can list algorithms by using the `algorithm` environment, as demonstrated here for algorithm 1.

Algorithm 1 Some algorithm

Some maths, e.g $f(x) = x^2$.

▷ Here's a comment

for $i = 0, 1, \dots, n - 1$ **do**

 Do something here

while Some condition **do**

 Do something more here

Maybe even some more math here, e.g $\int_0^1 f(x)dx$
