Matematisk modellering og numeriske metoder

Vink til opgaverne relateret til lektion 12

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Exercise 1

- How do the thermal conductivity, the specific heat capacity and the density enter the equation?
- Hint: through λ_n.
- Hint: which itself depends on c.

Exercise 2

- Compare the behavior of the heat and wave equations by drawing sketches of their eigenfunctions. Write down the differences.

Exercise 3

- The first one can be solved directly by using the product method, or, in other words, but picking the right u_n.
- Note that you have already computed the Fourier coefficients of the second one (cf. the exercises for Lecture 10).

Exercise 4

- Just plug $u(x,t)$ into the PDE! lektion 12.
- Before you try to solve the problem with $f(x) = 1$ STOP AND THINK! What would one expect PHYSICALLY in this situation? The solution is obvious.
- The Fourier coefficients of the function $f(x) = 1 - \frac{x}{\pi}$ has already been found (cf. the exercises for Lecture 9), with the one difference that f here is scaled by a factor $\frac{1}{\pi}$.