PARTIAL DIFFERENTIAL EQUATIONS
SPRING 2023

ASSIGNMENT 11.1
DUE MARCH 28

Exercise 1. Textbook exercise 3.7.2.

Exercise 2. Textbook exercise 3.7.4.

Exercise 3. Textbook exercise 3.7.5.

Exercise 4. Textbook exercise 3.7.7. Although the double integral in the formula for B_{mn} is separable, the integral with respect to x is a bit tricky to evaluate by hand. Feel free to use a computer to help.

Exercise 5. Separation of variables in the vibrating circular membrane problem leads to the ODE boundary value problem

$$r^2R'' + rR' + (\lambda^2 r^2 - m^2)R = 0, \;\; R(0+) \text{ finite}, \;\; R(a) = 0,$$

for the radial factor $R(r)$, with $m \in \mathbb{N}_0$. When $\lambda = 0$ the ODE reduces to an Euler equation. Show that in this case the only solution is $R \equiv 0$.