Homework 8

Due: Dec. 29 2025

1. Consider the 2D heat equation solver we developed in class. Work with an artificial intelligence assistant (e.g. Deepseek) and try to improve the code in clarity and performance. Elaborate on the actual improvement in details.

2. In our class, we have developed the code with special boundary conditions, that is, zero Dirichlet data ($\boldsymbol{g} = \mathbf{0}$) and zero Neumann data ($\boldsymbol{h} = \mathbf{0}$). Complete the code by allowing general boundary data （i.e. non-zero Dirichlet and Neumann boundary conditions）. Submit your code in your GitHub account. Consider the circular disk geometry given by circle.geo. Design a manufactured solution on the disk and verify your code. Report your convergence results. Visualize your results.

3. Exercise 1 on page 87.

4. Exercise 1 on page 123.

5. Exercise 3 on page 190.