

Name: _____

Date: _____

Collaborators: _____

(Collaborators submit their individually written assignments together)

- **Do not submit a paper copy (or a scan of it) of your assignment**
- **Share your gitlab submission with the instructor and the grader**
- **No late homework will be accepted**

| | | | | |
|-----------|----|----|----|-------|
| Question: | 1 | 2 | 3 | Total |
| Points: | 25 | 25 | 10 | 60 |
| Score: | | | | |

Instructor/grader comments:

Interpolating of functions

1. (a) (15 points) (pen and paper problem) Find the best linear approximation (in the least squares sense) to the function $\sinh(x)$ on the interval $[-1, 1]$. Write your answer in the README.md file.
- (b) (10 points) On the same graph plot the function and its approximation. Place the code you wrote for this part of the homework into a matlab file **hw06p1b.m**

Boundary value problem

2. (25 points) Use the shooting method to solve the following boundary value problem:

$$u'' - \frac{3}{x}u' + \frac{4}{x^2}u = 0, \quad u(0) = 0, \quad u(2) = 4\log(2).$$

Plot the solution and its error as a function of x . The exact solution of the BVP is $u(x) = x^2 \log(x)$.

Place the code you wrote for this part of the homework into a matlab file **hw06p2.m**

Gitlab

3. (10 points) Create a gitlab project called **hw06** (name it exactly as shown). Upload **all** required matlab code and create your README.md file. **Chose a suitable license.** Share the project with the instructor and the grader.