Prüfungsprotokoll – Mathematical Modelling in Life Insurance, 24.01.2024

1. Neural Network:
    - Define the neural nework layer
    - Assume you have the estimated parameters for the neural network layer, how do you define the loss function?
    - How do you optimize the loss function?
    - Solve backpropagation by an example
    - Explain the concept of backpropagation
    - Do you need to evaluate the backpropagation at the different nodes?

2. Cubic Splines
    - Define the optimization problem
    - What happens when Lambda goes to 0? To infinity?
    - How do you solve the optimization problem?

3. Whitteker Henderson
    - Define the optimization problem and describe the meaning of the terms
    - How are the discrete derivatives defined?
    - How do you solve the optimization problem?
    - Compute the first derivative of the optimization problem in matrix notation

4. Lee Carter model
    - Describe the Lee-Carter model
    - Define the loss function
    - Assume we have a solution for a_x, how do you solve for b_x and k_t?
    - Why can we use SVD to solve the problem?
    - Can you proof the lemma which defines the SVD?