**Class Test**

1. Assume you want to estimate the wage equation Wi = β0 + β1Xi + ui, where Wi is

the wage of worker i and Xi is the labour market experience of worker i.

(a) Assume you suspect that the intercept in the equations is different for men and

women. Explain how you will change the above model to test this suspicion?

(b) Assume you suspect that the slope (“return to experience") is different for men and women. Explain how you will change the above model to test this suspicion?

(c) Assume you suspect that the relationship between wage and experience resembles an upward slope. Explain how you will change the above model to test this suspicion?

2. L2 regularisation (also known as RIDGE regression) promotes smaller coefficients.

Briey explain the intuition behind regularisation.

A math equations and formulas

Description automatically generated with medium confidence

4. (i) Which of the following statement(s) correctly represents a real neuron?

A. A neuron has a single input and a single output only.

B. A neuron has multiple inputs but a single output only.

C. A neuron has a single input but multiple outputs.

D. A neuron has multiple inputs and multiple outputs.

E. All of the above statements are valid.

(ii) In a neural network, knowing the weight and bias of each neuron is the most important step. If you can somehow get the correct value of weight and bias for each neuron, you can approximate any function. What would be the best way to approach this?

A. Assign random values and pray to God they are correct.

B. Search every possible combination of weights and biases till you get the best value.

C. Iteratively check that after assigning a value how far you are from the best values, and slightly change the assigned values to make them better.

D. None of these

(iii) What are the steps for using a gradient descent algorithm?

1. Calculate error between the actual value and the predicted value.
2. Reiterate until you find the best weights of network.
3. Pass an input through the network and get values from output layer.
4. Initialize random weight and bias.
5. Go to each neuron which contributes to the error and change its respective values to reduce the error.

(iv) Which of the following techniques perform similar operations as dropout in a neural network?

A. Bagging B. Boosting C. Stacking D. None of these