# **Assignment 4**

1. Import training data provided in [Assignment\_4\_Data\_and\_Template.xlsxPreview the document](https://classroom.ucsc-extension.edu/courses/3126/files/658877/download?verifier=WRU9WNiEKgXQ9xd2jb9xQfVwTzuz28Ve2El39Cly&wrap=1)
2. Use the pseudoinverse method on the given training data to build two linear classifiers: (i) a binary classifier, and (ii) a multiclass classifier capable of distinguishing between 6 classes. The sheet titled "Training Data" contains the target class labels (Failure and Type). Paste your classifiers in the correct format as shown in the sheet titled "Classifiers"
3. Apply the classifiers to the data provided in the sheet "To be classified." Paste the results into the sheet.
4. Evaluate the performance of your classifiers using the metrics requested in the sheet "Performance"

For guidance, see slides titled "Step-by-step: Linear Classifier Design" in the lecture on linear classifiers.

A completed spreadsheet is your submission. Except for writing results into the correct cells, do not alter the spreadsheets in any other way.

**Extra Credit Opportunity:**

Flex your linear algebra muscles, mindfully!

Refer to the slide titled "What the pseudoinverse does"

* In the context of Assignment 4, what does wbest represent?
* In the context of Assignment 4, what does b represent?
* Can you compute the vector bp of Assignment 4?
* Can you compute 5 random vectors (b1,b2,b3,b4,b5) lying on the "Assignment 4 counterpart of the shaded plane" in the slide?
* Using distance calculations, can you check that none of these random vectors are as close to b as bp is?

Use [Assignment\_4\_Extra\_Credit.xlsxPreview the document](https://classroom.ucsc-extension.edu/courses/3126/files/654450/download?verifier=VQTFBEIAuHjjkbWySCPvtPUUM2AjvWdCjx645aah&wrap=1) to submit your answers. Good luck and enjoy!

NOTE: Submitting a correct solution to this assignment will potentially get you a score of 125/100 for Assignment 4. [Similar to the situation in Assignment 2.] Please write to me if you need further clarification.

Rubric