

# Math 342W/642/742W

Recitation – Day #5 (2.13.25)

## I. Multinomial Classification

- (i) What is the output space,  $\mathcal{Y}$ , for the response variable in the context of *multinomial classification* problems?
- (ii) What is the *null model*,  $g_0$ , in the context of *multinomial classification* problem?
- (iii) What is the *L1 loss*? *L2 loss*?

## II. Regression

- (i) What is the output space,  $\mathcal{Y}$ , for the response variable in the context of *regression*?
- (ii) What is the *null model*,  $g_0$ , in the context of *regression*?
- (iii) What is the candidate set of functions,  $\mathcal{H}$ , in the context of *regression*?
- (iv) Define the following errors:
  - Residual Error:
  - Sum of Absolute Errors (SAE):
  - Sum of Squared Errors (SSE):

### III. Simple Linear Regression

(i) Suppose  $p = 1$  for linear regression, define the following:

- $\mathcal{H}$ :
- $\hat{y}$ :
- Objective function:
- $\mathcal{A}$ :

(ii) Derive the bias term  $b_0$  in simple OLS:

(iii) Derive the weight  $b_1$  in simple OLS: