

# WS #4 - Bias-Variance Trade-off

Monday, September 8, 2025

Math 154 - Jo Hardin

Name: \_\_\_\_\_

Names of people you worked with: \_\_\_\_\_

Briefly describe to the group your favorite aspect of the neighborhood where you grew up.

**Task:** You want to be able to predict how many eggs your chickens will lay tomorrow. You have two approaches:

**A.** Decide that “Every chicken lays exactly 2 eggs per day.”

**B.** Build a model based on a large number of variables that you collect on your chickens: the number of times the rooster crows at dawn, how loud the tractor is, whether the farmer wears boots or sandals, which chicken sat closest to the window, etc. Use past data to create the model to predict exactly how many eggs each chicken will lay tomorrow.

For each approach, describe both the variance and the bias that you would expect in your prediction model.

**Solution:**

**A.** There is zero variance in the prediction because you predict 2 eggs per day, every day. There is, however, potentially a large bias if the number of eggs laid per day is not close to 2.

**B.** The model will be quite variable because they are being fit to a lot of variables that aren't necessarily related to how many eggs the chick will lay. The models have low bias, however, because it fits the training data perfectly.