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Module 4 Discussion Reply

I think compared to how I approached the problem, your answer to this discussion is great due to its simplicity. What I mean is that you make the now obvious connection between and . I did not actually notice that the only difference between these two equations is the term in the center. I was also not clear on what was meant exactly by using the “hat” matrix in the decomposition. For example, if you merely substituted the matrix into your resulting decomposition, I am not sure if that would suffice for a “correct” response to this discussion. I also had a similar set of assumptions that you had listed also in your response.

In my response, I tried to rewrite the , , and terms so that they can be seen as some form of , where the term would vary for each formula. I then did a similar process of adding and subtracting within each of the parentheses. This leads to a formula that has both and , but it also includes some other terms that are different. My goal then is to show that these other terms zero out through some math. This is when I tried to include the “hat” matrix. However, it’s worth noting that in order for me to write as some term, it also required that I used this same process involving the “hat” matrix.

It’s a bit complicated if your linear algebra is rusty, but basically it comes down to the term. I understood it to be a vector where each item is equal to . To rexpress this , I used , where is a matrix of 1’s only. The trick is that is a projection matrix based on the design matrix , where the design matrix itself contains a column of 1’s for the intercept term. The result then is that , due to the properties of the “hat” matrix. Like I said, I wasn’t entirely sure on what the professor had expected for the response. So, I also rewrote and in terms of “hat” matrix terms.