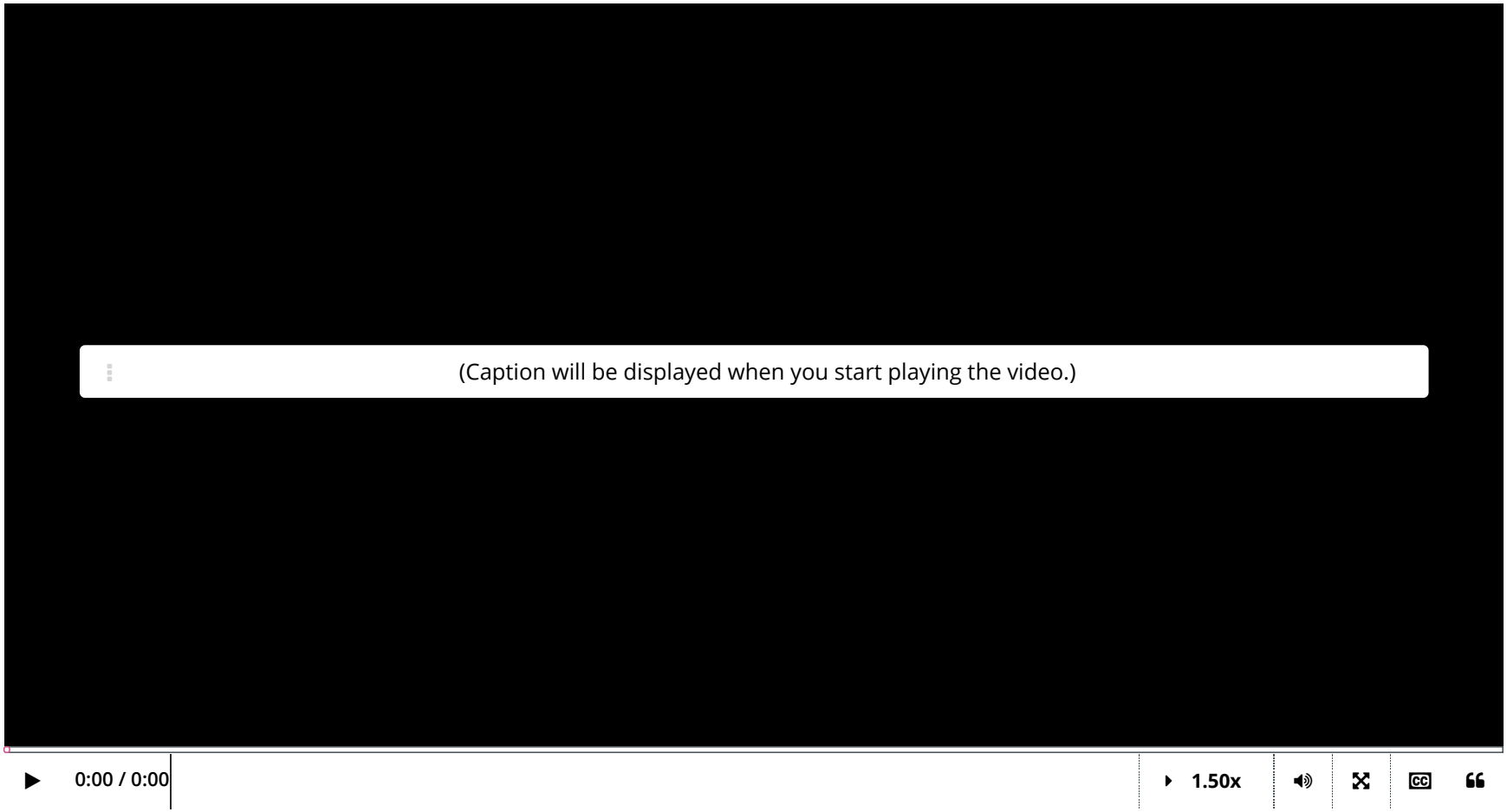
10. Prediction Error

Prediction Error



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Estimating the variance

1/1 point (graded)
Use same setup as in the previous problems.

Setup as in the previous problems

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Recall the formula for the mean prediction error $\mathbb{E}\|\mathbf{Y} - \mathbb{X}\hat{\boldsymbol{\beta}}\|_2^2$ in terms of n, p and σ^2 (given in the solution of the previous problem). This suggests a formula for an unbiased estimator of σ^2:

$$\hat{\sigma}^2 = \frac{1}{n-p}\|\mathbf{Y} - \mathbb{X}\hat{\boldsymbol{\beta}}\|_2^2.$$

Assume that based on your findings, the **residual sum** $\|\mathbf{Y} - \mathbb{X}\hat{\boldsymbol{\beta}}\|_2^2$ evaluates to 104.9. Compute $\hat{\sigma}^2$, to the nearest thousandths (10^{-3}) digit.

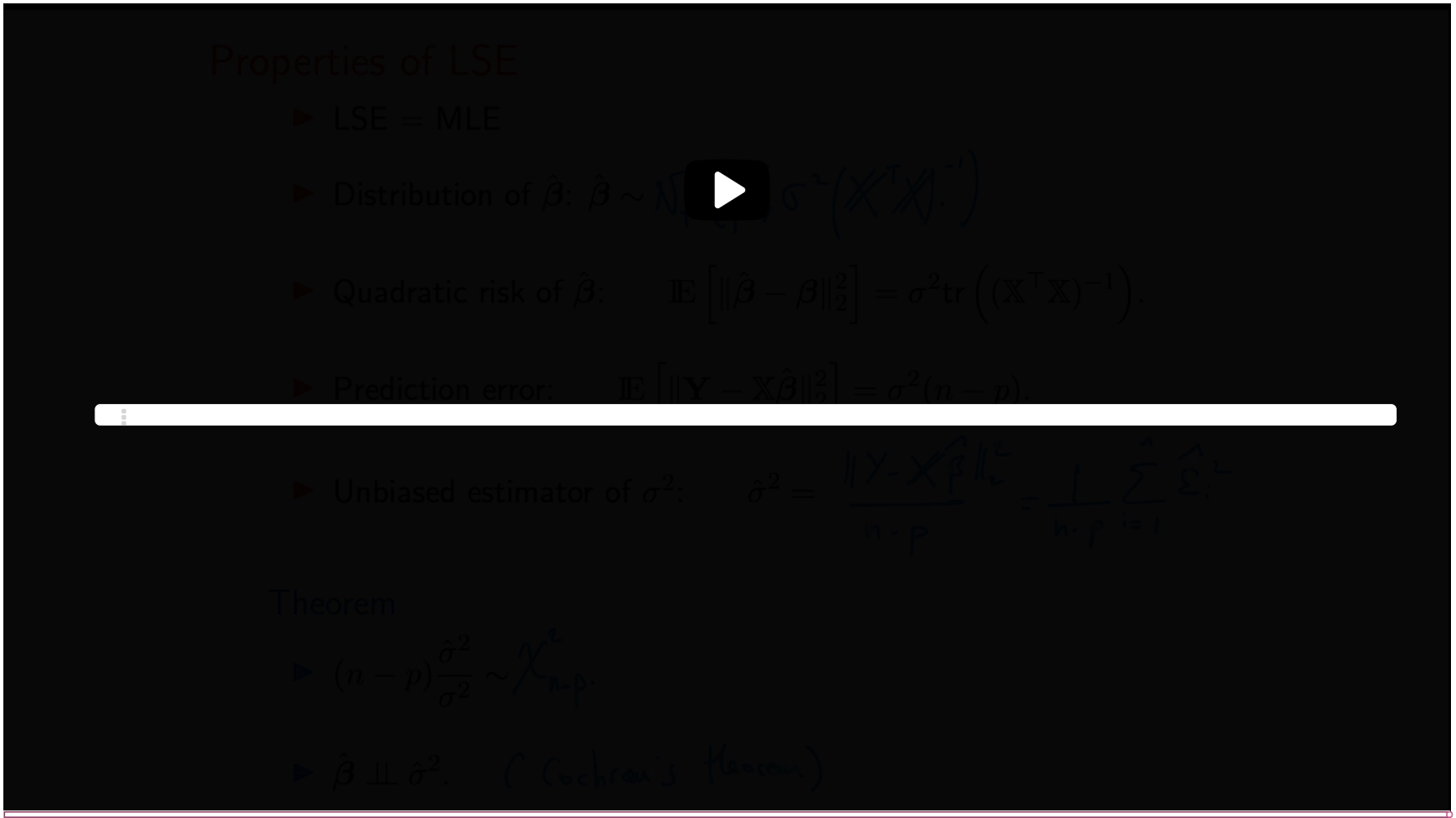
0.1051102 ✔ **Answer:** 0.105

Solution:

The formula calls for $n = 1000$, $p = 2$ and $\|\mathbf{Y} - \mathbb{X}\hat{\boldsymbol{\beta}}\|_2^2 = 104.9$. Plugging these numbers in gives $\hat{\sigma^2} = \frac{104.9}{1000-2} \approx 0.105$.

Submit You have used 1 of 3 attempts

Answers are displayed within the problem



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