P4

September 11, 2021

[1]:
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#4
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$$
\begin{aligned}
\text{Var}[\hat{Y}_h] =& \text{Var}[\hat{\beta}_0 \bar{x} + \hat{\beta}_1 x_h] \\
=& \text{Var}[\bar{y} - \hat{\beta}_1 \bar{x} + \hat{\beta}_1 x_h] \\
=& \text{Var}[\bar{y} + \hat{\beta}_1 (x_h - \bar{x})] \\
=& \text{Var}[\bar{y}] + \text{Var}[\hat{\beta}_1 (x_h - \bar{x})] \\
=& \frac{\sigma^2}{n} + \text{Var}[\hat{\beta}_1 (x_h - \bar{x})]
\end{aligned}
$$