

## **Formulas**

$$b_1 = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{\sum (X_i - \bar{X})^2}$$

$$b_0 = \bar{Y} - b_1 \bar{X}$$

$$\mathbf{b} = (\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{Y}$$

$$\mathbf{s}^2\{\mathbf{b}\} = \text{MSE}(\mathbf{X}'\mathbf{X})^{-1}$$

<b>Inference on <math>b_1</math></b>	
Estimated standard error of $b_1$	$s\{b_1\} = \sqrt{\frac{\text{MSE}}{\sum (X_i - \bar{X})^2}}$
<b>Inference on <math>b_0</math></b>	
Estimated standard error of $b_0$	$s\{b_0\} = \sqrt{\text{MSE} \left( \frac{1}{n} + \frac{\bar{X}^2}{\sum (X_i - \bar{X})^2} \right)}$
<b>Inference on <math>\hat{Y}_h</math></b>	
Estimated standard error of $\hat{Y}_h$	$s\{\hat{Y}_h\} = \sqrt{\text{MSE} \left( \frac{1}{n} + \frac{(X_h - \bar{X})^2}{\sum (X_i - \bar{X})^2} \right)}$
<b>Inference on <math>Y_{h(\text{new})}</math></b>	
Estimated standard error of $Y_{h(\text{new})}$	$s\{\text{pred}\} = \sqrt{\text{MSE} \left( 1 + \frac{1}{n} + \frac{(X_h - \bar{X})^2}{\sum (X_i - \bar{X})^2} \right)}$