

Illustrate the correspondence between typical scalar notation of several statistics and their matrix notation. To the degree possible, show the relations between the components of the matrix algebra and how they correspond to the components of the conceptual formula. The conceptual formulas are given in scalar notation below.

<i>Statistic</i>	<i>Scalar Notation</i>	<i>Matrix Notation</i>
Regression weights, $\hat{\beta}$ s	$\hat{\beta} = \frac{S_{XY}}{S_X^2}$	
Predicted value, \hat{y}	$\hat{y} = bX$	
Residuals, e		
MSE	$\sum (Y_i - \hat{Y})^2 / df$	
Var($\hat{\beta}$ s)	$V(\hat{\beta}) = \frac{MSE}{\sum (X_i - \bar{X})^2}$	
SE($\hat{\beta}$ s)	$\sqrt{Var(\hat{\beta})}$	