

11.1: Matrix Algebra and Multiple Regression

Matrix algebra is widely used for the derivation of multiple regression because it permits a compact, intuitive depiction of regression analysis. For example, an estimated multiple regression model in scalar notation is expressed as: $Y = A + BX_1 + BX_2 + BX_3 + E$. Using matrix notation, the same equation can be expressed in a more compact and (believe it or not!) intuitive form: $y = Xb + e$.

In addition, matrix notation is flexible in that it can handle any number of independent variables. Operations performed on the model matrix XX , are performed on all independent variables simultaneously. Lastly, you will see that matrix expression is widely used in statistical presentations of the results of OLS analysis. For all these reasons, then, we begin with the development of multiple regression in matrix form.

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