

USING ROTATION TRANSFORMATIONS TO MAXIMIZE THE COEFFICIENT OF DETERMINATION IN SIMPLE LINEAR REGRESSION MODELS

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ABSTRACT

In many instances, excessive variation in observed data limits the utility of simple linear regression. We show that a simple rotation of the coordinate axis about the origin reduces the observed variance in the data, improves estimates of the slope, and increases the coefficient of determination. Furthermore, we provide a modified version of the basic regression model that accommodates a rotation angle and a method for determining the angle that maximizes the coefficient of determination.

Keywords: Linear Regression, Transformation, Rotation Matrix, Maximization, and Coefficient of Determination.