|  |
| --- |
| Math 563 |
| Homework |
| Linear Model |

|  |
| --- |
| Ryan Watson  10-31-2014 |

1. Statement of Problem

The problem is to predict the energy consumption of the winter of 1971 (the first quarter of 1971). Write out the linear model y=Xβ+ε.

Table : Original Data



1. Summary of Solution

As said above, the goal of this problem is to create a linear model to best fit the data. To do this I used an Ordinary Least Squares solution. The solution to the Least Squares problem is given by the normal equation, which is shown below.

Χβ=

Eq. 1

Where can be solved for by simply manipulating Eq. 1.

Χ)

Eq. 2

The two variables needed to solve for are shown below.

Χ =

Y=

By solving Eq.2 with the matrix X and vector Y given above I was able to accurately predict the energy consumption for the winter months. The Equations for can be seen below as Eq. 3. In the equation shown below the subscripts on the “C’s” correspond the column of data shown in Table 1.

+1.1628+0.8174-598.26

Eq. 3

Below is a graph of the actual energy consumption for the winter months and the estimated energy consumption estimated by using Eq. 3

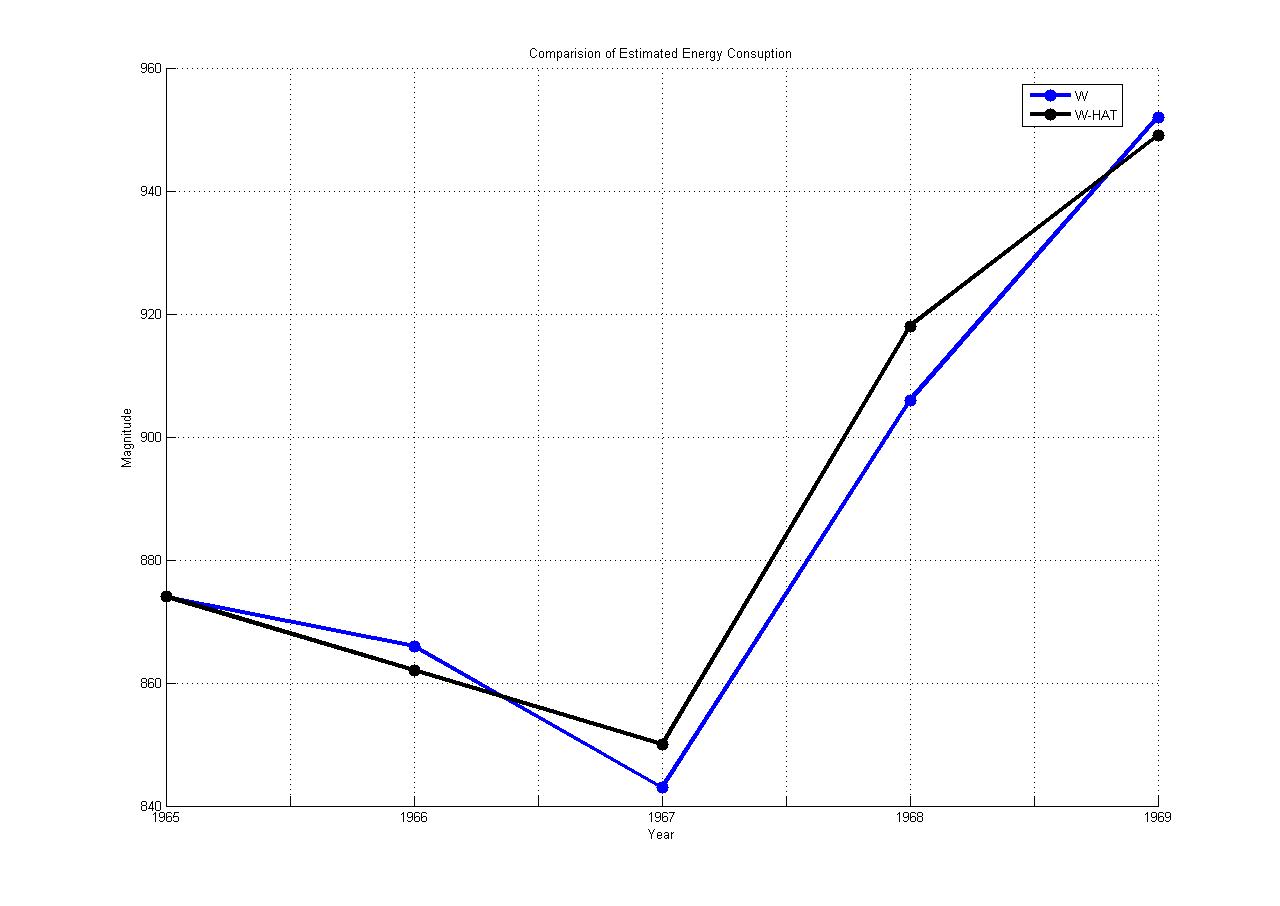


Figure 1: Comparison of Estimated vs Actual