



Linear

$$z = a + bx + cy$$

Mon Aug 1 11:31:03 2011 local server time

Coefficients

$z = a + bx + cy$

Fitting target of sum of squared absolute error = 2.5742607304390858E+04

a = 1.2108487031717381E+02

b = -5.1268724669712418E+00

c = -1.7279661588663637E+00

# Coefficient and Fit Statistics

From `scipy.odr.odrpack` and <http://www.scipy.org/Cookbook/OLS>

Degrees of freedom (error): 298.0  
Degrees of freedom (regression): 2.0  
R-squared: 0.920485635698  
R-squared adjusted: 0.919951982246  
Model F-statistic: 1724.87525898  
Model F-statistic p-value: 1.11022302463e-16  
Model log-likelihood: -1096.64377052  
AIC: 7.30660312637  
BIC: 7.34355106921  
Root Mean Squared Error (RMSE): 9.24789772364

a = 1.2108487031717381E+02  
std err squared: 2.31549E+00  
t-stat: 7.95736E+01  
p-stat: 0.00000E+00  
95% confidence intervals: [1.18090E+02, 1.24079E+02]  
b = -5.1268724669712418E+00  
std err squared: 1.47454E-02  
t-stat: -4.22206E+01  
p-stat: 0.00000E+00  
95% confidence intervals: [-5.36584E+00, -4.88790E+00]  
c = -1.7279661588663637E+00  
std err squared: 3.38331E-02  
t-stat: -9.39429E+00  
p-stat: 0.00000E+00  
95% confidence intervals: [-2.08995E+00, -1.36598E+00]

Coefficient Covariance Matrix  
[ 0.02680439 -0.00053019 -0.00194147]  
[-0.00053019 0.00017069 -0.0001477 ]  
[-0.00194147 -0.0001477 0.00039166]

# Error Statistics

	Absolute Error	Relative Error
Minimum:	-2.832815E+01	-5.363083E+00
Maximum:	2.392842E+01	1.599397E+01
Mean:	1.904420E-14	1.098004E-01
Std. Error of Mean:	5.339276E-01	6.973974E-02
Median:	2.330414E-01	2.559514E-03
Variance:	8.552361E+01	1.459090E+00
Standard Deviation:	9.247898E+00	1.207928E+00
Pop. Variance (N-1):	8.552361E+01	1.459090E+00
Pop. Std Dev (N-1):	9.247898E+00	1.207928E+00
Variation:	4.856019E+14	1.100113E+01
Skew:	-2.254143E-02	8.222925E+00
Kurtosis:	-3.375443E-02	1.052267E+02

# Data Statistics

	X	Y	Z
Minimum:	-1.490266E+00	1.474000E+00	1.800000E-01
Maximum:	1.992469E+01	1.878200E+01	1.309155E+02
Mean:	1.097791E+01	9.097113E+00	4.908300E+01
Std. Error of Mean:	3.103295E-01	2.048707E-01	1.893475E+00
Median:	1.133417E+01	8.903000E+00	4.556364E+01
Variance:	2.889132E+01	1.259161E+01	1.075574E+03
Standard Deviation:	5.375065E+00	3.548465E+00	3.279595E+01
Pop. Variance (N-1):	2.889132E+01	1.259161E+01	1.075574E+03
Pop. Std Dev (N-1):	5.375065E+00	3.548465E+00	3.279595E+01
Variation:	4.896253E-01	3.900650E-01	6.681733E-01
Skew:	-2.638248E-01	2.936840E-01	3.550434E-01
Kurtosis:	-9.146943E-01	-4.017431E-01	-1.097364E+00

Source Code in C++

```
// To the best of my knowledge this code is correct.  
// If you find any errors or problems please contact  
// me at zunzun@zunzun.com.  
//      James
```

```
#include
```

```
// sum of squared absolute error
```

```
double Linear3D_model(double x_in, double y_in)  
{  
    double temp;  
    temp = 0.0;  
  
    // coefficients  
    double a = 1.2108487031717381E+02;  
    double b = -5.1268724669712418E+00;  
    double c = -1.7279661588663637E+00;  
  
    temp += a;  
    temp += b * x_in;  
    temp += c * y_in;  
    return temp;  
}
```

Source Code in Java

```
// To the best of my knowledge this code is correct.  
// If you find any errors or problems please contact  
// me at zunzun@zunzun.com.  
//      James
```

```
import java.lang.Math;
```

```
// sum of squared absolute error
```

```
class Linear3D  
{  
    double Linear3D_model(double x_in, double y_in)  
    {  
        double temp;  
        temp = 0.0;  
  
        // coefficients  
        double a = 1.2108487031717381E+02;  
        double b = -5.1268724669712418E+00;  
        double c = -1.7279661588663637E+00;  
  
        temp += a;  
        temp += b * x_in;  
        temp += c * y_in;  
        return temp;  
    }  
}
```

Source Code in Python

```
# To the best of my knowledge this code is correct.  
# If you find any errors or problems please contact  
# me at zunzun@zunzun.com.  
#     James
```

```
import math
```

```
# sum of squared absolute error
```

```
def Linear3D_model(x_in, y_in):  
    temp = 0.0
```

```
    # coefficients  
    a = 1.2108487031717381E+02  
    b = -5.1268724669712418E+00  
    c = -1.7279661588663637E+00
```

```
    temp += a  
    temp += b * x_in  
    temp += c * y_in  
    return temp
```



Source Code in C#

```
// To the best of my knowledge this code is correct.  
// If you find any errors or problems please contact  
// me at zunzun@zunzun.com.  
//      James
```

```
using System;
```

```
// sum of squared absolute error
```

```
class Linear3D  
{  
    double Linear3D_model(double x_in, double y_in)  
    {  
        double temp;  
        temp = 0.0;  
  
        // coefficients  
        double a = 1.2108487031717381E+02;  
        double b = -5.1268724669712418E+00;  
        double c = -1.7279661588663637E+00;  
  
        temp += a;  
        temp += b * x_in;  
        temp += c * y_in;  
        return temp;  
    }  
}
```

Source Code in SCILAB

```
// To the best of my knowledge this code is correct.
// If you find any errors or problems please contact
// me at zunzun@zunzun.com.
//      James

// sum of squared absolute error

function z=Linear3D_model(x_in, y_in)
    temp = 0.0

    // coefficients
    a = 1.2108487031717381E+02
    b = -5.1268724669712418E+00
    c = -1.7279661588663637E+00

    temp = temp + a
    temp = temp + b * x_in
    temp = temp + c * y_in

    z = temp
endfunction
```

Source Code in MATLAB

```
% To the best of my knowledge this code is correct.  
% If you find any errors or problems please contact  
% me at zunzun@zunzun.com.  
%      James
```

```
% sum of squared absolute error
```

```
function z=Linear3D_model(x_in, y_in)  
    temp = 0.0;
```

```
    % coefficients  
    a = 1.2108487031717381E+02;  
    b = -5.1268724669712418E+00;  
    c = -1.7279661588663637E+00;
```

```
    temp = temp + a;  
    temp = temp + b .* x_in;  
    temp = temp + c .* y_in;
```

```
    z = temp;
```

Source Code in VBA

```
' To the best of my knowledge this code is correct.  
' If you find any errors or problems please contact  
' me at zunzun@zunzun.com.  
'      James
```

```
' sum of squared absolute error
```

```
Public Function Linear3D_model(x_in, y_in)
```

```
    temp = 0.0
```

```
    ' coefficients
```

```
    a = 1.2108487031717381E+02
```

```
    b = -5.1268724669712418E+00
```

```
    c = -1.7279661588663637E+00
```

```
    temp = temp + a
```

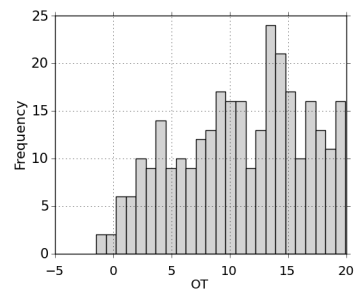
```
    temp = temp + b * x_in
```

```
    temp = temp + c * y_in
```

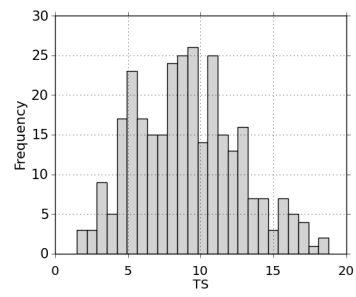
```
    Linear3D_model = temp
```

```
End Function
```

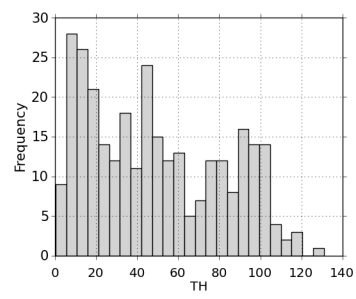
Histogram of OT



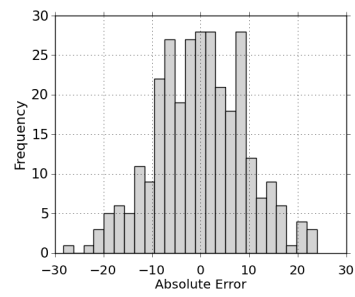
Histogram of TS



Histogram of TH

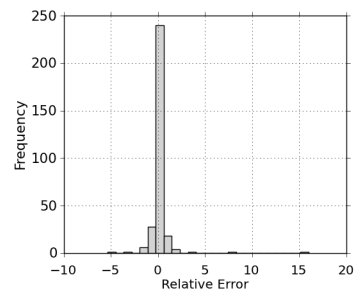


Histogram of Absolute Error

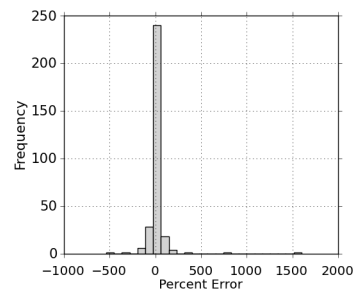




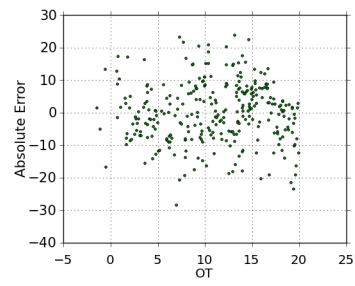
Histogram of Relative Error



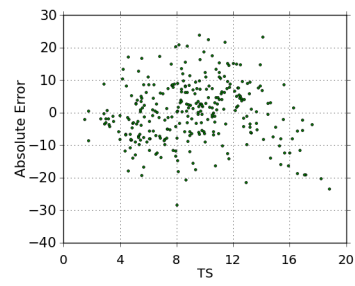
Histogram of Percent Error



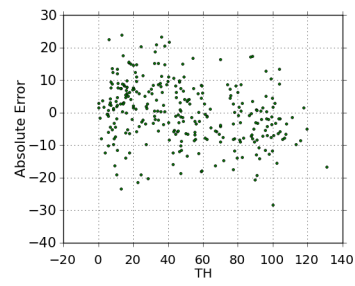
Absolute Error vs. OT



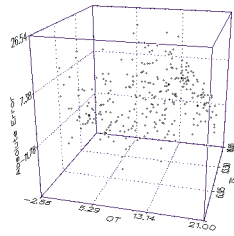
Absolute Error vs. TS



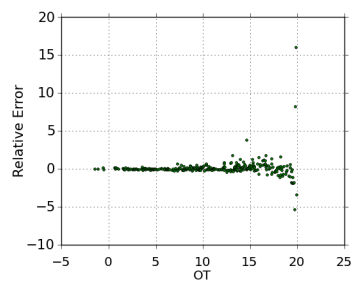
Absolute Error vs. TH



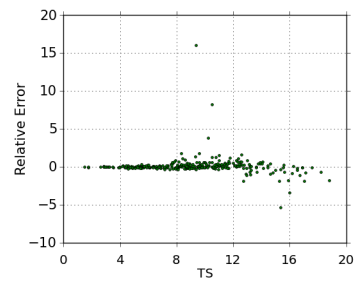
## Absolute Error Scatter Plot



Relative Error vs. OT

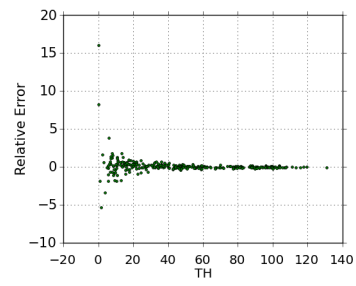


Relative Error vs. TS

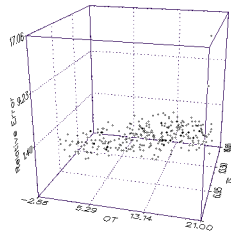




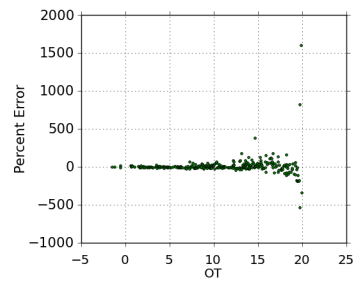
Relative Error vs. TH



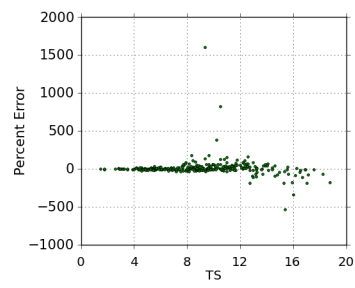
## Relative Error Scatter Plot



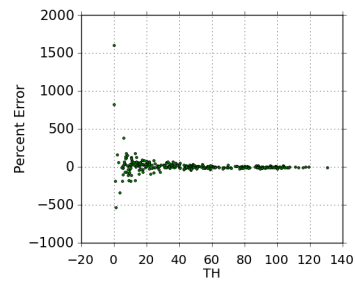
Percent Error vs. OT



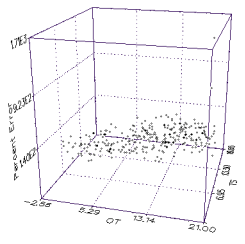
Percent Error vs. TS



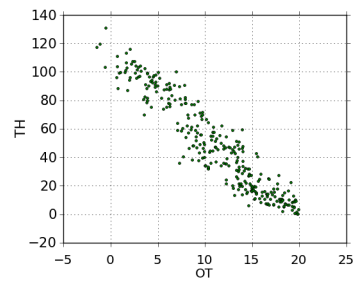
Percent Error vs. TH



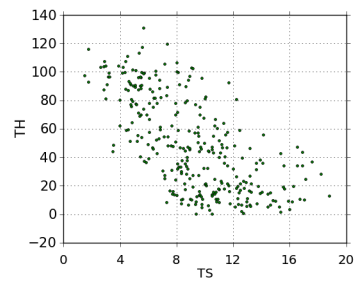
Percent Error Scatter Plot



TH vs. OT

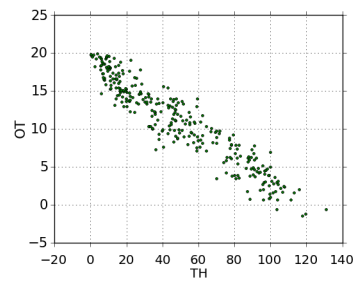


TH vs. TS

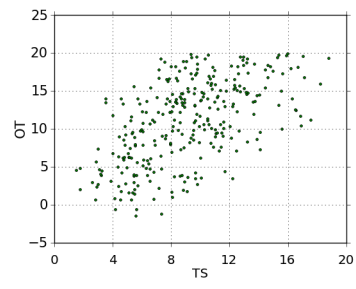




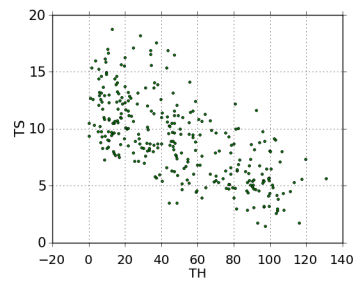
OT vs. TH



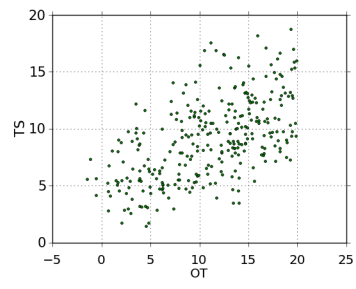
OT vs. TS



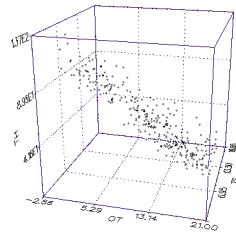
TS vs. TH



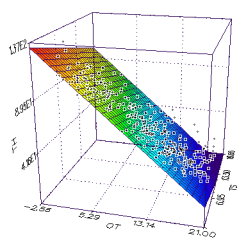
TS vs. OT



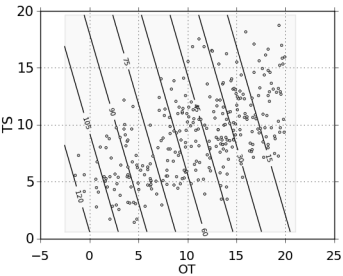
## Scatter Plot



Surface Plot



Contour Plot



#### Ephesians 5:1-4

Be ye therefore followers of God, as dear children; And walk in love, as Christ also hath loved us, and hath given himself for us an offering and a sacrifice to God for a sweetsmelling savour. But fornication, and all uncleanness, or covetousness, let it not be once named among you, as becometh saints; Neither filthiness, nor foolish talking, nor jesting, which are not convenient: but rather giving of thanks.

Read or search the King James Bible online at  
<http://quod.lib.umich.edu/k/kjv/>