



Linear

$$z = a + bx + cy$$

Wed Aug 3 11:33:34 2011 local server time

Coefficients

$z = a + bx + cy$

Fitting target of sum of squared absolute error = 2.7273361918749470E+04

a = 1.3962243554245268E+02

b = -5.7836120378728895E+00

c = -1.9800812271384505E+00

Coefficient and Fit Statistics

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

Degrees of freedom (error): 271.0
Degrees of freedom (regression): 2.0
R-squared: 0.925825599636
R-squared adjusted: 0.925278187087
Model F-statistic: 1691.27580587
Model F-statistic p-value: 1.11022302463e-16
Model log-likelihood: -1019.0628154
AIC: 7.46031252116
BIC: 7.49987231795
Root Mean Squared Error (RMSE): 9.97686409759

a = 1.3962243554245268E+02
 std err squared: 2.97657E+00
 t-stat: 8.09276E+01
 p-stat: 0.00000E+00
 95% confidence intervals: [1.36226E+02, 1.43019E+02]
b = -5.7836120378728895E+00
 std err squared: 1.62972E-02
 t-stat: -4.53046E+01
 p-stat: 0.00000E+00
 95% confidence intervals: [-6.03494E+00, -5.53228E+00]
c = -1.9800812271384505E+00
 std err squared: 4.35467E-02
 t-stat: -9.48867E+00
 p-stat: 0.00000E+00
 95% confidence intervals: [-2.39092E+00, -1.56924E+00]

Coefficient Covariance Matrix
[0.02957653 -0.00070978 -0.00216585]
[-0.00070978 0.00016194 -0.00013012]
[-0.00216585 -0.00013012 0.0004327]

Error Statistics

	Absolute Error	Relative Error
Minimum:	-2.511095E+01	-4.733764E+00
Maximum:	3.345511E+01	1.046578E+01
Mean:	-6.295046E-14	1.279927E-01
Std. Error of Mean:	6.038273E-01	6.072324E-02
Median:	-9.448127E-01	-1.864789E-02
Variance:	9.953782E+01	1.006636E+00
Standard Deviation:	9.976864E+00	1.003313E+00
Pop. Variance (N-1):	9.953782E+01	1.006636E+00
Pop. Std Dev (N-1):	9.976864E+00	1.003313E+00
Variation:	-1.584876E+14	7.838825E+00
Skew:	2.084597E-01	5.027457E+00
Kurtosis:	8.238245E-02	4.900524E+01

Data Statistics

	X	Y	Z
Minimum:	5.735739E-02	1.744000E+00	1.236885E+00
Maximum:	1.999945E+01	1.773600E+01	1.247213E+02
Mean:	1.108346E+01	8.338518E+00	5.900904E+01
Std. Error of Mean:	3.299398E-01	2.018432E-01	2.217102E+00
Median:	1.122490E+01	8.207500E+00	5.727291E+01
Variance:	2.971886E+01	1.112221E+01	1.341943E+03
Standard Deviation:	5.451501E+00	3.334997E+00	3.663254E+01
Pop. Variance (N-1):	2.971886E+01	1.112221E+01	1.341943E+03
Pop. Std Dev (N-1):	5.451501E+00	3.334997E+00	3.663254E+01
Variation:	4.918589E-01	3.999508E-01	6.207954E-01
Skew:	-6.033466E-02	3.873945E-01	-3.157044E-02
Kurtosis:	-1.295396E+00	-3.013980E-01	-1.418129E+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 = 1.3962243554245268E+02;  
    double b = -5.7836120378728895E+00;  
    double c = -1.9800812271384505E+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 = 1.3962243554245268E+02;  
        double b = -5.7836120378728895E+00;  
        double c = -1.9800812271384505E+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 = 1.3962243554245268E+02  
    b = -5.7836120378728895E+00  
    c = -1.9800812271384505E+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 = 1.3962243554245268E+02;  
        double b = -5.7836120378728895E+00;  
        double c = -1.9800812271384505E+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 = 1.3962243554245268E+02  
    b = -5.7836120378728895E+00  
    c = -1.9800812271384505E+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 = 1.3962243554245268E+02;  
    b = -5.7836120378728895E+00;  
    c = -1.9800812271384505E+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 = 1.3962243554245268E+02
```

```
    b = -5.7836120378728895E+00
```

```
    c = -1.9800812271384505E+00
```

```
    temp = temp + a
```

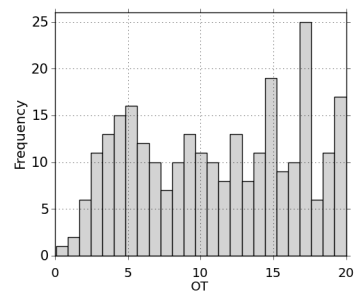
```
    temp = temp + b * x_in
```

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

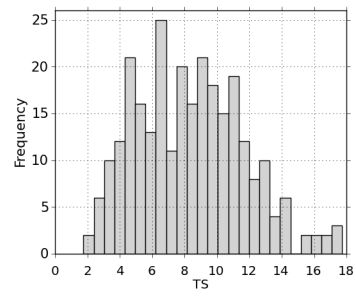
```
    Linear3D_model = temp
```

```
End Function
```

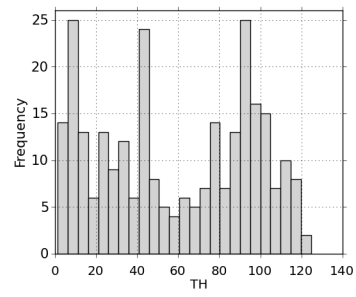
Histogram of OT



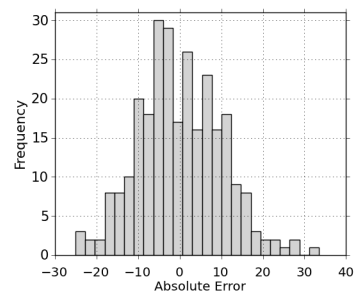
Histogram of TS



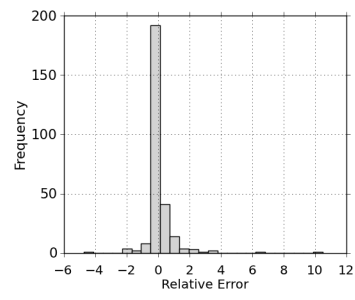
Histogram of TH



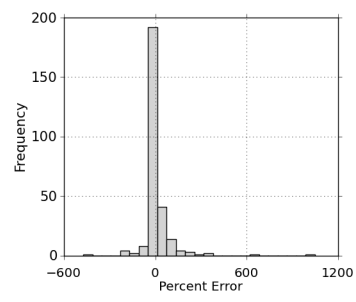
Histogram of Absolute Error



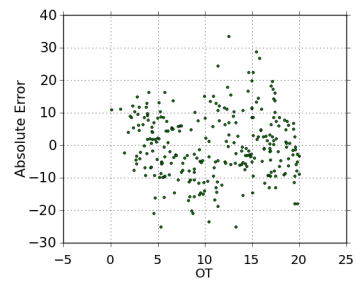
Histogram of Relative Error



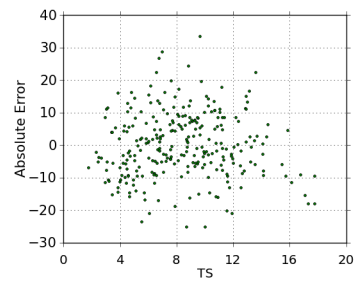
Histogram of Percent Error



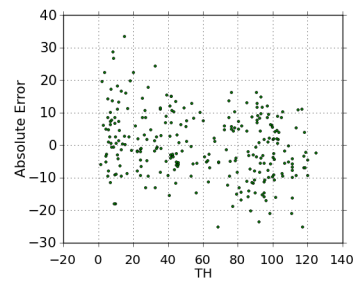
Absolute Error vs. OT



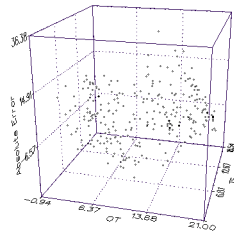
Absolute Error vs. TS



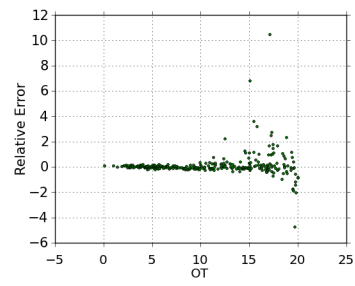
Absolute Error vs. TH



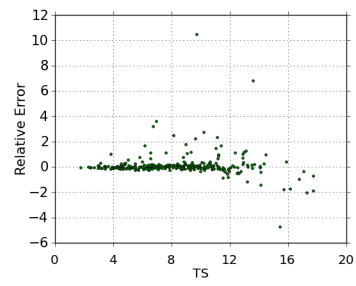
Absolute Error Scatter Plot



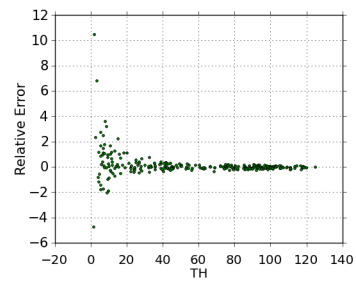
Relative Error vs. OT



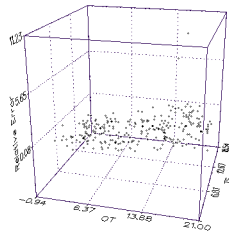
Relative Error vs. TS



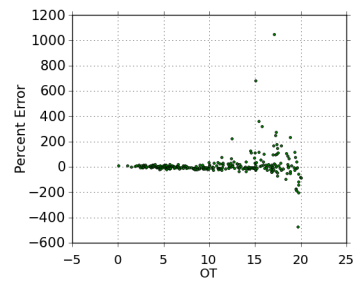
Relative Error vs. TH



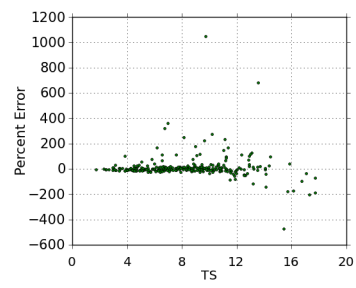
Relative Error Scatter Plot



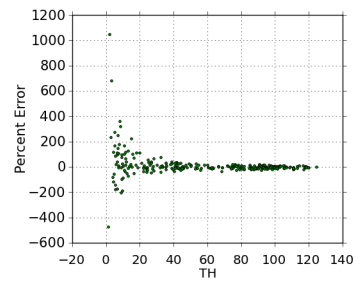
Percent Error vs. OT



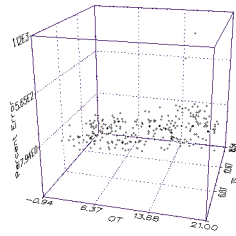
Percent Error vs. TS



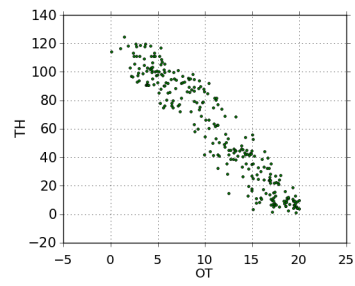
Percent Error vs. TH



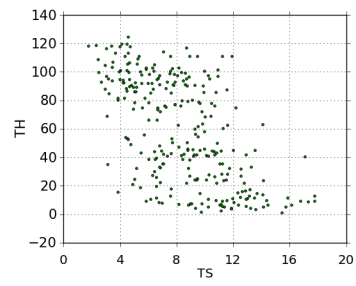
Percent Error Scatter Plot



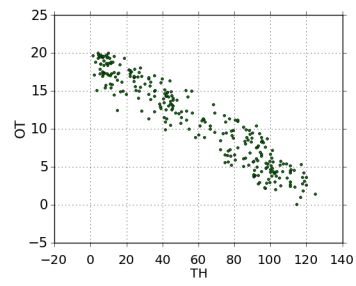
TH vs. OT



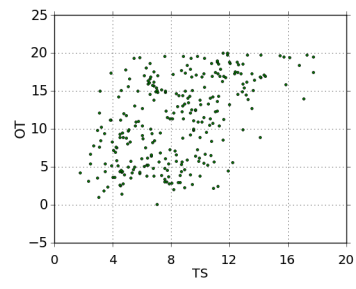
TH vs. TS



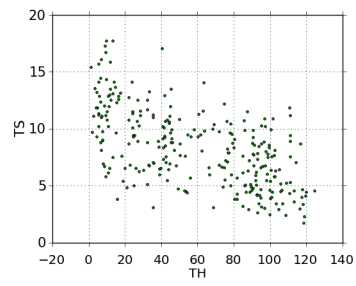
OT vs. TH



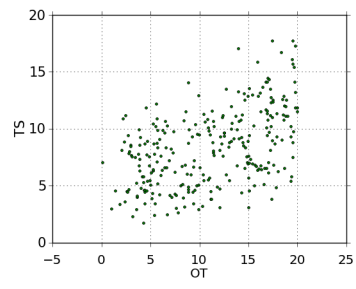
OT vs. TS



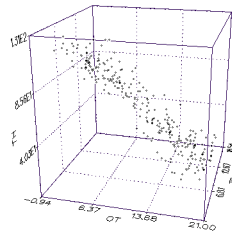
TS vs. TH



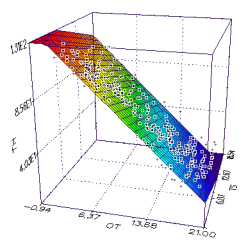
TS vs. OT



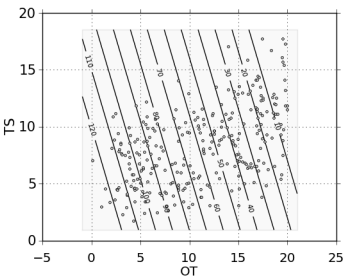
Scatter Plot



Surface Plot



Contour Plot



Philippians 4:11-13

Not that I speak in respect of want: for I have learned, in whatsoever state I am, therewith to be content. I know both how to be abased, and I know how to abound: every where and in all things I am instructed both to be full and to be hungry, both to abound and to suffer need. I can do all things through Christ which strengtheneth me.

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