LAMPIRAN 1

PROGRAM KOMPUTER

2.1. Program Menyimpan Data

Program Menyimpan_data;
Uses
Crt,Regresi;
Var
y : Vektor;
x : Matriks;
i,j,baris,kolom : Integer;
filv : File of Vektor;
film : File of Matriks;
viles,viles2 : string[10];
jwb:char;

Begin
Repeat
Clrscr;
Write('Masukkan nama file yang akan disimpan utk y = ');readln(viles);
Assign (filv,viles); {menyimpan Y dalam file}
Rewrite(filv);
Write('Jumlah baris : ');Readln(baris);
{jumlah pasangan data}
Write('Jumlah kolom : ');Readln(kolom);
{jumlah variabel bebas}
Writeln('Y : ');
For i:= 1 To baris Do begin
Readin(y[i]); {membaca elemen-elemen vektor Y}
Write(filv,y);end;
Close(filv);

Clrscr;
Write('Masukkan nama file yang akan disimpan utk x = ');readln(viles2);
Assign(film,viles2); {menyimpan X dalam file}
Rewrite(film);
Writeln('X : ');
For i:= 1 To baris Do
Begin
For j:= 1 To kolom Do
Begin
Gotoxy(7*(j),i+2);
Readin(x[i,j]);
Write(film,x); {membaca elemen-elemen X kolom 1 sampai kolom 7}
End;
End;
Close(file);
Tekan_esc;
Clrscr;
Write('Ingin menyimpan data lagi (Y/T) ?
Readln(JWB);
Until NOT(JWB IN['Y','y']);
End.

2.2. Unit Regresi

Unit Regresi;
Interface
Uses Crt;
Const
max = 25;
Type
indeks = 1..max;
Matriks = Array[indeks,indeks] of Real;
Vektor = Array[indeks] of Real;
Var
i,j:Byte;

Procedure Tekan_Esc;
Procedure Kali_transpose_1(m,n:Byte; x:Matriks; y:Vektor;
         Var z:Vektor);
Procedure Kali_transpose_2(m,n:Byte; x:Matriks;
         Var z:Matriks);
Procedure Kali_transpose_3(n:Byte; y1,y2:Vektor;
         Var z:Real);
Procedure Matriks_invers(baris:Byte; x:Matriks;
         Var z:Matriks);
Procedure Kali_Matriks(baris_x,kolom_x,kolom_y:Byte;
         x:Matriks; y:Vektor; Var z:Vektor);
Procedure Anova(k,m:Byte; koef,z,zk:Vektor; Var r,mse:Real);

Implementation
Procedure Tekan_esc;
Const
tekan = 'Tekan <Esc>'';
Begin
Gotoxy(70-Length(tekan),24);
Write(tekan);
Repeat Until Readkey = #27;
End;

Procedure Kali_transpose_1(m,n:Byte; x:Matriks; y:Vektor;
    Var z:Vektor);
Var
i,k:Byte;
Begin
For i:=1 To m Do
Begin
    z[i]:=0;
For k:=1 To n Do
    z[i]:=z[i]+x[k,i]*y[k];
End;
End;

Procedure Kali_transpose_2(m,n:Byte; x:Matriks;
    Var z:Matriks);
Var
i,j,k:Byte;
Begin
For i:=1 To m Do
For j:=1 To m Do
Begin
    z[i,j]:=0;
For k:=1 To n Do
    z[i,j]:=z[i,j]+x[k,i]*x[k,j];
End;
End;

Procedure Kali_transpose_3(n:Byte; y1,y2:Vektor;
    Var z:Real);
Var
i,k:Byte;
Begin
    z:=0;
For i:=1 To n Do
    z:=z+y1[i]*y2[i];
End;

Procedure Matriks_invers(baris:Byte; x:Matriks;
    Var z:Matriks);
Var
det,det_y:Real;
i,j,k,l,m,n:Byte;
tanda:Integer;
y:Matriks;
Procedure Eliminasi_gauss(baris,kolom:Byte; x:Matriks;
    Var det:Real);
Var
tanda:Integer;
j,k,l,m,n:Byte;
konst:Real;
Begin
    tanda:=1;
    For l:=2 To baris Do
        Begin
            For m:=l To baris Do
                Begin
                    k:=l-1;
                    If x[k,k] = 0 Then
                        Begin
                            konst:=0;
                            n:=k-1;
                            While(konst=0)And(n<=baris) Do
                                Begin
                                    n:=n+1;
                                    konst:=x[n,k];
                                End;
                    End;
                    If konst<>0 Then
                        Begin
                            tanda:=-tanda;
                            For j:=k To kolom Do
                                Begin
                                    konst:=x[k,j];
                                    x[k,j]:=x[n,j];
                                    x[n,j]:=konst;
                                End;
                        End
                    Else
                        Begin
                            x[k,k]:=1;
                            tanda:=0;
                        End;
                    konst:=x[m,k]/x[k,k];
                    For n:=k To kolom Do
                        x[m,n]:=x[m,n]-konst*x[k,n];
                    End;
                End;
            det:=tanda;
            For m:=1 To baris Do det:=det*x[m,m];
        End;
    End;
Begin
{---Menghitung harga determinan---}
Eliminasi_Gauss(baris,baris,x,det);

{---Menghitung invers---}
For i=1 To baris Do
  Begin
    For j=1 To baris Do
      Begin
        m:=0;
        For k:=1 To baris Do
          Begin
            If i<>k Then
              Begin
                m:=m+1;
                n:=0;
                For l:=1 To baris Do
                  Begin
                    If j<>l Then
                      Begin
                        n:=n+1;
                        y[m,n] := x[k,l];
                      End;
                    End;
                  End;
                End;
              End;
            End;
          End;
        End;
      End;
    End;
  End;
End;

Eliminasi_Gauss(baris-1,baris-1,y,det_y);
If(i+j) mod 2=0 Then tanda:=1 Else tanda:=-1;
z[j,i]:=tanda*det_y/det;
End;
End;
End;
End;

Procedure Kali_Matriks(baris_x,kolom_x,kolom_y:Byte;
           x:Matriks; y:Vektor, Var z:Vektor);
Var
  k,m,n:Byte;
Begin
  For m:=1 To baris_x Do
    For n:=1 To kolom_y Do
      Begin
        z[m]:=0;
        For k:=1 To kolom_x Do
          z[m]:=z[m]+x[m,k]*y[k];
        End;
      End;
  End;
End;
Procedure Anova(k,m:Byte; koef,z,k:Vektor; Var r,mse:Real);
Var
i:Byte;
f,sst,ssr,sse,mse,ay:Real;

Function Rata_rata(n:Integer; x:Vektor):Real;
Var
i:Integer;
sum_x:Real;
Begin
sum_x:=0;
For i:=1 To n Do
sum_x:=sum_x+x[i];
Rata_rata:=sum_x/n;
End;

Procedure Tabel_anova(k,n:Byte; sst,ssr,sse,mse,f:Real);
Var
i:Byte;
Begin
WriteLn;WriteLn;
WriteLn('Tabel ANOVA:');
For i:=3 To 60 Do Write('=*');
Write;
WriteLn('Sumber');
Gotoxy(16,Wherey-1);WriteLn('Jumlah');
Gotoxy(36,Wherey-1);WriteLn('Rata-rata');
WriteLn('variasi');
Gotoxy(16,Wherey-1);WriteLn('Kuadrat');
Gotoxy(26,Wherey-1);WriteLn('dk:3');
Gotoxy(36,Wherey-1);WriteLn('Kuadrat');
Gotoxy(50,Wherey-1);WriteLn('F:3');
For i:=3 To 60 Do Write('*');
Write;
WriteLn('Regresi');
Gotoxy(16,Wherey-1);WriteLn('SSR:5:3');
Gotoxy(26,Wherey-1);WriteLn('k-1:3');
Gotoxy(36,Wherey-1);WriteLn('msr:5:3');
Gotoxy(50,Wherey-1);WriteLn('f:5:3');
WriteLn('Kesalahan');
Gotoxy(16,Wherey-1);WriteLn('sse:5:3');
Gotoxy(26,Wherey-1);WriteLn('n-k:3');
Gotoxy(36,Wherey-1);WriteLn('mse:5:3');
For i:=3 To 60 Do Write('*');
Writeln;
  Writeln('Keseluruhan');
  gotoxy(16,Wherey-1); Writeln(sst:5:3);
  gotoxy(26,Wherey-1); Writeln(n:1:3);

  For i:= 3 To 60 Do Write('=');
  Writeln; Writeln;
  Writeln('Ra2' r:7:3);
  End;

Begin
  Kali_transposed (m, z, ay);
  sst:=ay-m*Sqr(Rata_rata(m, z));

  Kali_transpose (m, koef, zk, ay);
  ssr:=ay-m*Sqr(Rata_rata(m, z));
  sse:= sst-ssr;
  msr:= ssr/(k-1);
  mse:= sse/(m-k);
  f:=msr/mse;
  r:= 1-(mse(m-1)/sst);
  Tabel_anova(k, m, sst, ssr, sse, msr, mse, f);
  End;
End.

2.3. Program Cetak

Program Cetak;
Uses
  Crt, Regresi;

Var
  x, xt, xi : Matriks;
  b, xy, y, z : Vektor;
  m, n, i, j, k, baris, kolom : Integer;
  axy, r, mse, y_rata, yy : Real;

Procedure Keluaran(Var x: Matriks; Var y: Vektor);
Var
  Data_mat : File of Matriks;
  Data_vek : File of Vektor;
  i, j, m, n, baris, kolom : Integer;
  viles, vile2 : string[10];
Begin
  Clnscr;
Write('Masukkan nama file data Y = ');readln(viles);
Assign(Data_vek,viles);
Reset(Data_vek);
Clrscr;
Writeln('Y :');
i:=1;
While not (eof(Data_vek)) do
begin
Read(Data_vek, y);
Writeln(y[i]:5:2);i:=i+1;
end;
Close(Data_vek);
Tekan_esc;
Clrscr;
Write('Masukkan nama file data X = ');readln(vile2);
Writeln('Jumlah baris file - ',vile2,' = ')Readln(m);
Writeln('Jumlah kolom file - ',vile2,' = ')Readln(n);
Assign(Data_mat,vile2);
Reset(Data_mat);
Clrscr;
Writeln('X :');
for i:=1 to m do
begin
for j:=1 to n do
begin
Read(Data_mat,x);
Writeln(X[i,j]:8:2);
end;
Writeln;
end;
Close(Data_mat);
Tekan_esc;
End;

Function Rata_rata(n:Integer; x:Vector):Real;
Var
i:Integer;
sum_x:Real;
Begin
sum_x:=0;
For i:=1 To n Do
sum_x:=sum_x+x[i];
Rata_rata:=sum_x/n;
End;
Begin {--Program utama--} 
Clrscr;
Keluaran(x,y); {data yang akan diproses}

Clrscr;
Write('Masukkan jumlah baris yang akan diproses = ');Readln(baris);
Write('Masukkan jumlah kolom yang akan diproses = ');Readln(kolom);
Clrscr;
Writeln('X(T)Y :'); {menghitung transpose X kali Y}
Kali_transpose_1(kolom,baris,x,y,xy);
For i:= 1 To kolom Do
Write(xy[i]:8:2);

WriteLn;
WriteLn;
WriteLn('X(T)X :'); {menghitung transpose X kali X}
Kali_transpose_2(kolom,baris,x,xt);
For i:= 1 To kolom Do
Begin
For j:= 1 To kolom Do
Write(xt[i,j]:8:3);
WriteLn;
End;

WriteLn;
WriteLn('X(T)X(-1) :'); {menghitung invers hasil kali transpose X}
Matriks_invers(kolom,xt,xi); {dengan X}
For i:= 1 To kolom Do
Begin
For j:= 1 To kolom Do
Write(xi[i,j]:8:2);
WriteLn;
End;

WriteLn;
WriteLn(b :'); {menghitung koefisien regresi b}
Kali_matriks(kolom,kolom,1,xi,xy,b);
For i:= 1 To kolom Do
Write(b[i]:8:2);
Tekan_esc;
Clrscr;
WriteLn;
Anova(kolom,baris,b,y,xy,r,mse); {tabel ANOVA}
Tekan_esc;
End.
LAMPIRAN 2
DATA PERCobaAN
PADA PENGUKURAN TEKSTUR KUE PASTEL IKAN

2.1. Data I

<table>
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<tr>
<th>Y</th>
<th>1.98</th>
<th>1.70</th>
<th>0.68</th>
<th>0.67</th>
<th>1.53</th>
<th>1.48</th>
<th>1.18</th>
<th>1.40</th>
<th>1.45</th>
<th>1.39</th>
<th>1.19</th>
<th>1.12</th>
<th>1.65</th>
<th>1.54</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>1.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 1.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 1.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 1.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 1.00 0.00 0.00 0.00 0.00</td>
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<td>0.00 0.50 0.50 0.00 0.00 0.25 0.00</td>
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<td>0.33 0.33 0.33 0.11 0.11 0.11 0.03</td>
<td></td>
</tr>
</tbody>
</table>
### 2.2. Data II

**Y:**
- 3.12
- 2.89
- 1.18
- 1.24
- 2.36
- 2.27
- 1.96
- 1.90
- 2.66
- 2.48
- 1.80
- 1.86
- 2.09
- 1.79

**X:**

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<td>0.00</td>
<td>0.25</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
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<td>0.33</td>
<td>0.33</td>
<td>0.33</td>
<td>0.11</td>
<td>0.11</td>
<td>0.11</td>
<td>0.03</td>
</tr>
</tbody>
</table>
2.3. Data III

Y:
2.34
2.30
0.97
0.97
2.11
2.13
1.48
1.43
1.80
2.06
1.21
1.34
1.53
1.56

X:
1.00 0.00 0.00 0.00 0.00 0.00 0.00
1.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 1.00 0.00 0.00 0.00 0.00 0.00
0.00 1.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 1.00 0.00 0.00 0.00 0.00
0.00 0.00 1.00 0.00 0.00 0.00 0.00
0.50 0.50 0.00 0.25 0.00 0.00 0.00
0.50 0.50 0.00 0.25 0.00 0.00 0.00
0.50 0.00 0.50 0.00 0.25 0.00 0.00
0.50 0.00 0.50 0.00 0.25 0.00 0.00
0.00 0.50 0.50 0.00 0.25 0.00 0.00
0.00 0.50 0.50 0.00 0.25 0.00 0.00
0.33 0.33 0.33 0.11 0.11 0.11 0.03
0.33 0.33 0.33 0.11 0.11 0.11 0.03
LAMPIRAN 3

OUTPUT HASIL ANALISA DATA

3.1. Data I

Masukkan jumlah baris yang akan diproses = 14
Masukkan jumlah kolom yang akan diproses = 7

\[
X(T)Y : \\
\begin{bmatrix}
7.44 & 4.85 & 6.64 & 1.00 & 1.06 & 0.93 & 0.10
\end{bmatrix}
\]

\[
X(T)X : \\
\begin{bmatrix}
3.218 & 0.718 & 0.718 & 0.323 & 0.323 & 0.073 & 0.020 \\
0.718 & 3.218 & 0.718 & 0.323 & 0.323 & 0.073 & 0.020 \\
0.718 & 0.718 & 3.218 & 0.073 & 0.323 & 0.323 & 0.020 \\
0.323 & 0.323 & 0.073 & 0.149 & 0.024 & 0.024 & 0.007 \\
0.323 & 0.073 & 0.323 & 0.024 & 0.149 & 0.024 & 0.007 \\
0.073 & 0.323 & 0.323 & 0.024 & 0.024 & 0.149 & 0.007 \\
0.020 & 0.020 & 0.020 & 0.007 & 0.007 & 0.007 & 0.002 \\
\end{bmatrix}
\]

\[
[X(T)X][-1] : \\
\begin{bmatrix}
0.50 & 0.00 & 0.00 & -1.00 & -1.00 & -0.00 & 1.83 \\
0.00 & 0.50 & 0.00 & -1.00 & -0.00 & -1.00 & 1.83 \\
0.00 & 0.00 & 0.50 & -0.00 & -1.00 & -1.00 & 1.83 \\
-1.00 & -1.00 & -0.00 & 12.00 & 2.00 & 2.00 & -36.67 \\
-1.00 & -0.00 & -1.00 & 2.00 & 12.00 & 2.00 & -36.67 \\
-0.00 & -1.00 & -1.00 & 2.00 & 2.00 & 12.00 & -36.67 \\
\end{bmatrix}
\]

\[
b : \\
\begin{bmatrix}
1.84 & 0.68 & 1.51 & 0.13 & -1.01 & 0.26 & 11.22
\end{bmatrix}
\]

Tabel ANOVA:

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>Rata-rata Kuadrat</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regresi</td>
<td>1.652</td>
<td>0.275</td>
<td>25.703</td>
</tr>
<tr>
<td>Kesalahan</td>
<td>0.075</td>
<td>0.011</td>
<td></td>
</tr>
<tr>
<td>Keseluruhan</td>
<td>1.727</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

Ra²: 0.919
3.1.1. Kasus 1 : Model Kuadratik

Masukkan jumlah baris yang akan diproses  = 14
Masukkan jumlah kolom yang akan diproses = 6

\[
X(T)Y : \\
\begin{bmatrix}
7.44 & 4.85 & 6.64 & 1.00 & 1.06 & 0.93 \\
\end{bmatrix}
\]

\[
X(T)X : \\
\begin{bmatrix}
3.218 & 0.718 & 0.323 & 0.323 & 0.073 \\
0.718 & 3.218 & 0.323 & 0.073 & 0.323 \\
0.323 & 0.073 & 0.149 & 0.024 & 0.024 \\
0.323 & 0.073 & 0.323 & 0.024 & 0.149 \\
0.073 & 0.323 & 0.323 & 0.024 & 0.149 \\
\end{bmatrix}
\]

\[
[X(T)X]^{-1} : \\
\begin{bmatrix}
0.50 & -0.00 & -0.00 & -0.93 & -0.93 & 0.07 \\
-0.00 & 0.50 & -0.00 & -0.93 & 0.07 & -0.93 \\
-0.00 & -0.00 & 0.50 & 0.07 & -0.93 & -0.93 \\
-0.93 & -0.93 & 0.07 & 10.50 & 0.50 & 0.50 \\
-0.93 & 0.07 & -0.93 & 0.50 & 10.50 & 0.50 \\
0.07 & -0.93 & -0.93 & 0.50 & 0.50 & 10.50 \\
\end{bmatrix}
\]

\[
b : \\
\begin{bmatrix}
1.82 & 0.65 & 1.48 & 0.59 & -0.55 & 0.72 \\
\end{bmatrix}
\]

Tabel ANOVA:

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>dk</th>
<th>Rata-rata Kuadrat</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regresi</td>
<td>1.512</td>
<td>5</td>
<td>0.302</td>
<td>11.247</td>
</tr>
<tr>
<td>Kesalahan</td>
<td>0.215</td>
<td>8</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>Keseluruhan</td>
<td>1.727</td>
<td>13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ra2: 0.798
3.1.2. Kasus 2 : Model Linier

Masukkan jumlah baris yang akan diproses = 14
Masukkan jumlah kolom yang akan diproses = 3

\[
X(T)Y = \begin{pmatrix}
7.44 & 4.85 & 6.64 \\
\end{pmatrix}
\]

\[
X(T)X = \begin{pmatrix}
3.218 & 0.718 & 0.718 \\
0.718 & 3.218 & 0.718 \\
0.718 & 0.718 & 3.218 \\
\end{pmatrix}
\]

\[
[X(T)X]^{-1} = \begin{pmatrix}
0.34 & -0.06 & -0.06 \\
-0.06 & 0.34 & -0.06 \\
-0.06 & -0.06 & 0.34 \\
\end{pmatrix}
\]

\[
b = \begin{pmatrix}
1.81 \\
0.77 \\
1.49 \\
\end{pmatrix}
\]

Tabel ANOVA:

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>dk</th>
<th>Rata-rata Kuadrat</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regresi</td>
<td>1.398</td>
<td>2</td>
<td>0.699</td>
<td>23.357</td>
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<tr>
<td>Kesalahan</td>
<td>0.329</td>
<td>11</td>
<td>0.030</td>
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</tr>
<tr>
<td>Keseluruhan</td>
<td>1.727</td>
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</table>

Ra2: 0.775
3.2. Data II

Masukkan jumlah baris yang akan diproses = 14
Masukkan jumlah kolom yang akan diproses = 7

\[
X(T)Y: \\
\begin{array}{cccccccc}
11.79 & 7.46 & 10.31 & 1.39 & 1.71 & 1.34 & 0.12 \\
\end{array}
\]

\[
X(T)X: \\
\begin{array}{cccccccc}
3.218 & 0.718 & 0.718 & 0.323 & 0.323 & 0.073 & 0.020 \\
0.718 & 3.218 & 0.718 & 0.323 & 0.073 & 0.323 & 0.020 \\
0.718 & 0.718 & 3.218 & 0.073 & 0.323 & 0.323 & 0.020 \\
0.323 & 0.323 & 0.073 & 0.149 & 0.024 & 0.024 & 0.007 \\
0.323 & 0.073 & 0.323 & 0.024 & 0.149 & 0.024 & 0.007 \\
0.073 & 0.323 & 0.323 & 0.024 & 0.024 & 0.149 & 0.007 \\
0.020 & 0.020 & 0.020 & 0.007 & 0.007 & 0.007 & 0.002 \\
\end{array}
\]

\[
[X(T)X]^{-1}: \\
\begin{array}{cccccccc}
0.50 & 0.00 & 0.00 & -1.00 & -1.00 & -0.00 & 1.83 \\
0.00 & 0.50 & 0.00 & -1.00 & -0.00 & -1.00 & 1.83 \\
0.00 & 0.00 & 0.50 & -0.00 & -1.00 & -1.00 & 1.83 \\
-1.00 & -1.00 & -0.00 & 12.00 & 2.00 & 2.00 & -36.67 \\
-1.00 & -0.00 & -1.00 & 2.00 & 12.00 & 2.00 & -36.67 \\
-0.00 & -1.00 & -1.00 & 2.00 & 2.00 & 12.00 & -36.67 \\
\end{array}
\]

\[
b: \\
\begin{array}{cccccccc}
3.00 & 1.21 & 2.32 & -0.71 & -0.36 & 0.27 & -4.23 \\
\end{array}
\]

Tabel ANOVA:

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>Rata-rata Kuadrat</th>
<th>F</th>
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<tbody>
<tr>
<td>Regresi</td>
<td>4.008</td>
<td>0.668</td>
<td>48.162</td>
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<td>Kesalahan</td>
<td>0.097</td>
<td>0.014</td>
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</tr>
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Keseluruhan     4.106  13

Ra2: 0.956
### 3.2.1. Kasus 1 : Model Kuadratik

Masukkan jumlah baris yang akan diproses = 14  
Masukkan jumlah kolom yang akan diproses = 6

$$X(T)Y :$$

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<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11.79</td>
<td>7.46</td>
<td>10.31</td>
<td>1.39</td>
<td>1.71</td>
</tr>
<tr>
<td>1.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$$X(T)X :$$

<p>| | | | | | |</p>
<table>
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<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.218</td>
<td>0.718</td>
<td>0.323</td>
<td>0.323</td>
<td>0.073</td>
<td></td>
</tr>
<tr>
<td>0.718</td>
<td>3.218</td>
<td>0.323</td>
<td>0.073</td>
<td>0.323</td>
<td></td>
</tr>
<tr>
<td>0.718</td>
<td>0.718</td>
<td>3.218</td>
<td>0.323</td>
<td>0.323</td>
<td></td>
</tr>
<tr>
<td>0.323</td>
<td>0.323</td>
<td>0.073</td>
<td>0.149</td>
<td>0.024</td>
<td></td>
</tr>
<tr>
<td>0.323</td>
<td>0.073</td>
<td>0.323</td>
<td>0.024</td>
<td>0.149</td>
<td></td>
</tr>
<tr>
<td>0.073</td>
<td>0.323</td>
<td>0.323</td>
<td>0.024</td>
<td>0.149</td>
<td></td>
</tr>
</tbody>
</table>

$$[X(T)X]^{-1} :$$

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
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<tbody>
<tr>
<td>0.50</td>
<td>-0.00</td>
<td>-0.00</td>
<td>-0.93</td>
<td>-0.93</td>
</tr>
<tr>
<td>-0.00</td>
<td>0.50</td>
<td>-0.00</td>
<td>-0.93</td>
<td>0.07</td>
</tr>
<tr>
<td>-0.00</td>
<td>-0.00</td>
<td>0.50</td>
<td>0.07</td>
<td>-0.93</td>
</tr>
<tr>
<td>-0.93</td>
<td>-0.93</td>
<td>0.07</td>
<td>10.50</td>
<td>0.50</td>
</tr>
<tr>
<td>-0.93</td>
<td>0.07</td>
<td>-0.93</td>
<td>0.50</td>
<td>10.50</td>
</tr>
<tr>
<td>0.07</td>
<td>-0.93</td>
<td>-0.93</td>
<td>0.50</td>
<td>0.50</td>
</tr>
</tbody>
</table>

$$b :$$

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>3.01</td>
<td>1.22</td>
<td>2.32</td>
</tr>
<tr>
<td>-0.88</td>
<td>-0.53</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Tabel ANOVA:

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>Rata-rata Kuadrat</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regresi</td>
<td>3.989</td>
<td>0.798</td>
<td>54.536</td>
</tr>
<tr>
<td>Kesalahan</td>
<td>0.117</td>
<td>0.015</td>
<td></td>
</tr>
</tbody>
</table>

| Keseluruhan    | 4.106          | 13                |

$R^2 : 0.954$
3.2.2. Kasus 2 : Model Linier

Masukkan jumlah baris yang akan diproses = 14
Masukkan jumlah kolom yang akan diproses = 3

\[
X(T)Y:
\begin{pmatrix}
11.79 & 7.46 & 10.31 \\
\end{pmatrix}
\]

\[
X(T)X:
\begin{pmatrix}
3.218 & 0.718 & 0.718 \\
0.718 & 3.218 & 0.718 \\
0.718 & 0.718 & 3.218 \\
\end{pmatrix}
\]

\[
[X(T)X]^{-1}:
\begin{pmatrix}
0.34 & -0.06 & -0.06 \\
-0.06 & 0.34 & -0.06 \\
-0.06 & -0.06 & 0.34 \\
\end{pmatrix}
\]

\[
b:
\begin{pmatrix}
2.89 & 1.16 & 2.30 \\
\end{pmatrix}
\]

Tabel ANOVA:

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>Rata-rata Kuadrat</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regresi</td>
<td>3.889</td>
<td>1.944</td>
<td>98.729</td>
</tr>
<tr>
<td>Kesalahan</td>
<td>0.217</td>
<td>0.020</td>
<td></td>
</tr>
<tr>
<td>Keseluruhan</td>
<td>4.106</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

\[R^2: 0.938\]
3.3. Data III

Masukkan jumlah baris yang akan diproses = 14
Masukkan jumlah kolom yang akan diproses = 7

\[
X(T)Y : \\
9.04 5.69 8.46 1.07 1.30 0.98 0.09
\]
\[
X(T)X : \\
3.218 0.718 0.718 0.323 0.323 0.073 0.020 \\
0.718 3.218 0.718 0.323 0.073 0.323 0.020 \\
0.718 0.718 3.218 0.073 0.323 0.323 0.020 \\
0.323 0.323 0.073 0.149 0.024 0.024 0.007 \\
0.323 0.073 0.323 0.024 0.149 0.024 0.007 \\
0.073 0.323 0.323 0.024 0.024 0.149 0.007 \\
0.020 0.020 0.020 0.007 0.007 0.007 0.002 \\
\]
\[
[X(T)X]^{-1} : \\
0.50 0.00 0.00 -1.00 -1.00 -0.00 1.83 \\
0.00 0.50 0.00 -1.00 -0.00 -1.00 1.83 \\
0.00 0.00 0.50 -0.00 -1.00 -1.00 1.83 \\
-1.00 -1.00 -0.00 12.00 2.00 2.00 -36.67 \\
-1.00 -0.00 -1.00 2.00 12.00 2.00 -36.67 \\
-0.00 -1.00 -1.00 2.00 2.00 12.00 -36.67 \\
1.83 1.83 1.83 -36.67 -36.67 -36.67 898.39 \\
\]
\[
b : \\
2.32 0.97 2.12 -0.76 -1.16 -1.08 2.99 \\
\]

Tabel ANOVA:

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>dk</th>
<th>Rata-rata Kuadrat</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regresi</td>
<td>2.799</td>
<td>6</td>
<td>0.467</td>
<td>72.656</td>
</tr>
<tr>
<td>Kesalahan</td>
<td>0.045</td>
<td>7</td>
<td>0.006</td>
<td></td>
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<tr>
<td>Keseluruhan</td>
<td>2.844</td>
<td>13</td>
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<td></td>
</tr>
</tbody>
</table>

Ra2: 0.97
3.3.1. Kasus 1: Model Kuadratik

Masukkan jumlah baris yang akan diproses = 14
Masukkan jumlah kolom yang akan diproses = 6

\[ X(T)Y : \]
\[
\begin{array}{cccccc}
9.04 & 5.69 & 8.46 & 1.07 & 1.30 & 0.98 \\
\end{array}
\]

\[ X(T)X : \]
\[
\begin{array}{cccccc}
3.218 & 0.718 & 0.718 & 0.323 & 0.323 & 0.073 \\
0.718 & 3.218 & 0.718 & 0.323 & 0.073 & 0.323 \\
0.718 & 0.718 & 3.218 & 0.073 & 0.323 & 0.323 \\
0.323 & 0.323 & 0.073 & 0.149 & 0.024 & 0.024 \\
0.323 & 0.073 & 0.323 & 0.024 & 0.149 & 0.024 \\
0.073 & 0.323 & 0.323 & 0.024 & 0.024 & 0.149 \\
\end{array}
\]

\[ [X(T)X]^{-1} : \]
\[
\begin{array}{cccccc}
0.50 & -0.00 & -0.00 & -0.93 & -0.93 & 0.07 \\
-0.00 & 0.50 & -0.00 & -0.93 & 0.07 & -0.93 \\
-0.00 & -0.00 & 0.50 & 0.07 & -0.93 & -0.93 \\
-0.93 & -0.93 & 0.07 & 10.50 & 0.50 & 0.50 \\
-0.93 & 0.07 & -0.93 & 0.50 & 10.50 & 0.50 \\
0.07 & -0.93 & -0.93 & 0.50 & 0.50 & 10.50 \\
\end{array}
\]

\[ b : \]
\[
\begin{array}{cccccc}
2.31 & 0.96 & 2.11 & -0.64 & -1.04 & -0.96 \\
\end{array}
\]

Tabel ANOVA:

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>dk</th>
<th>Rata-rata Kuadrat</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regresi</td>
<td>2.789</td>
<td>5</td>
<td>0.558</td>
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<td>Kesalahan</td>
<td>0.055</td>
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Ra2: 0.969
3.3.2. Kasus 2 : Model Linier

Masukkan jumlah baris yang akan diproses = 14
Masukkan jumlah kolom yang akan diproses = 3

\[
X(T)Y: \begin{bmatrix}
9.04 & 5.69 & 8.46 \\
\end{bmatrix}
\]

\[
X(T)X:
\begin{bmatrix}
3.218 & 0.718 & 0.718 \\
0.718 & 3.218 & 0.718 \\
0.718 & 0.718 & 3.218 \\
\end{bmatrix}
\]

\[
[X(T)X]^{-1}:
\begin{bmatrix}
0.34 & -0.06 & -0.06 \\
-0.06 & 0.34 & -0.06 \\
-0.06 & -0.06 & 0.34 \\
\end{bmatrix}
\]

\[
b: \begin{bmatrix}
2.19 & 0.84 & 1.95 \\
\end{bmatrix}
\]

**Tabel ANOVA:**

<table>
<thead>
<tr>
<th>Sumber variasi</th>
<th>Jumlah Kuadrat</th>
<th>Rata-rata Kuadrat</th>
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<td>Regresi</td>
<td>2.580</td>
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Ra2: 0.890
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</tr>
</tbody>
</table>

Derajat kebebasan untuk pembilang.

http://eprints.undip.ac.id

LAMPIRAN 4

TABEL DISTRIBUSI F (α = 0.01)


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