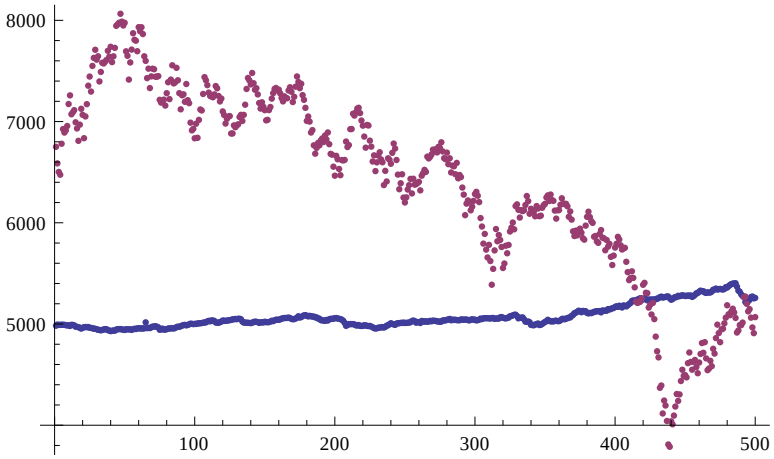
```
Exit[];
hedge = Flatten[Import["c:\\book1.txt", "Table"], 1][[1 ;; 500]];
Length[hedge]
```

500

```
g = FinancialData["DAX", "1.1.2000"];
dax = Transpose[g][[2]][[1 ;; Length[hedge]]];
ListPlot[{hedge, dax}]
```

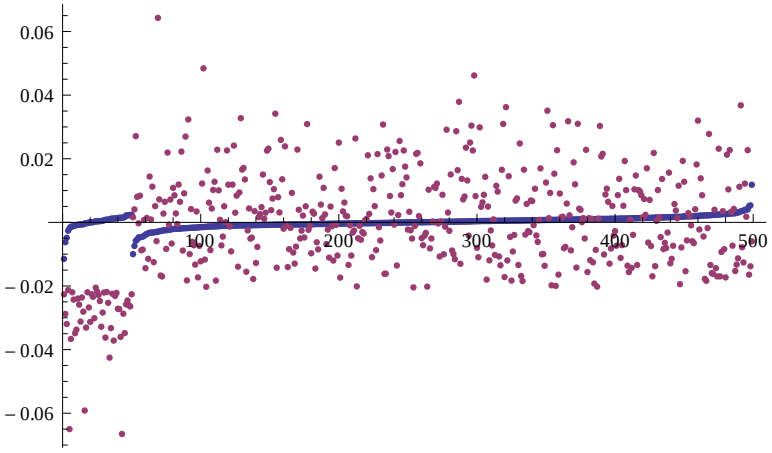



```
hedge = Log[hedge]; dax = Log[dax];
hedge = Differences[hedge];
dax = Differences[dax];
w = Transpose[{hedge, dax}];
w = Sort[w, #1[[2]] < #2[[2]] &];
hedge = Transpose[w][[1]];
dax = Transpose[w][[2]];
w[[110]]
```

{0.0011191, -0.0129811}

```
n = 50; w[[n]]
w2 = Join[Sort[w[[1 ;; n]], #1[[1]] < #2[[1]] &],
   Sort[w[[n + 1 ;; Length[w]]], #1[[1]] < #2[[1]] &]];
ListPlot[Transpose[w2], PlotRange → All]
```

```
{0.000288862, -0.0205337}
```

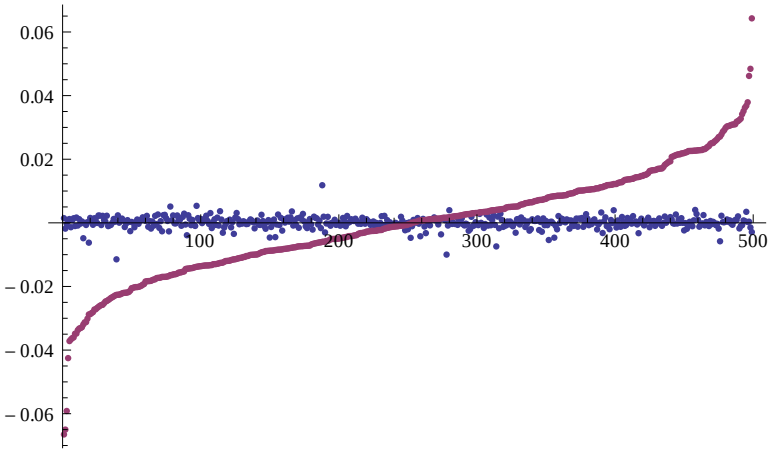



```
n = Length[w]
```

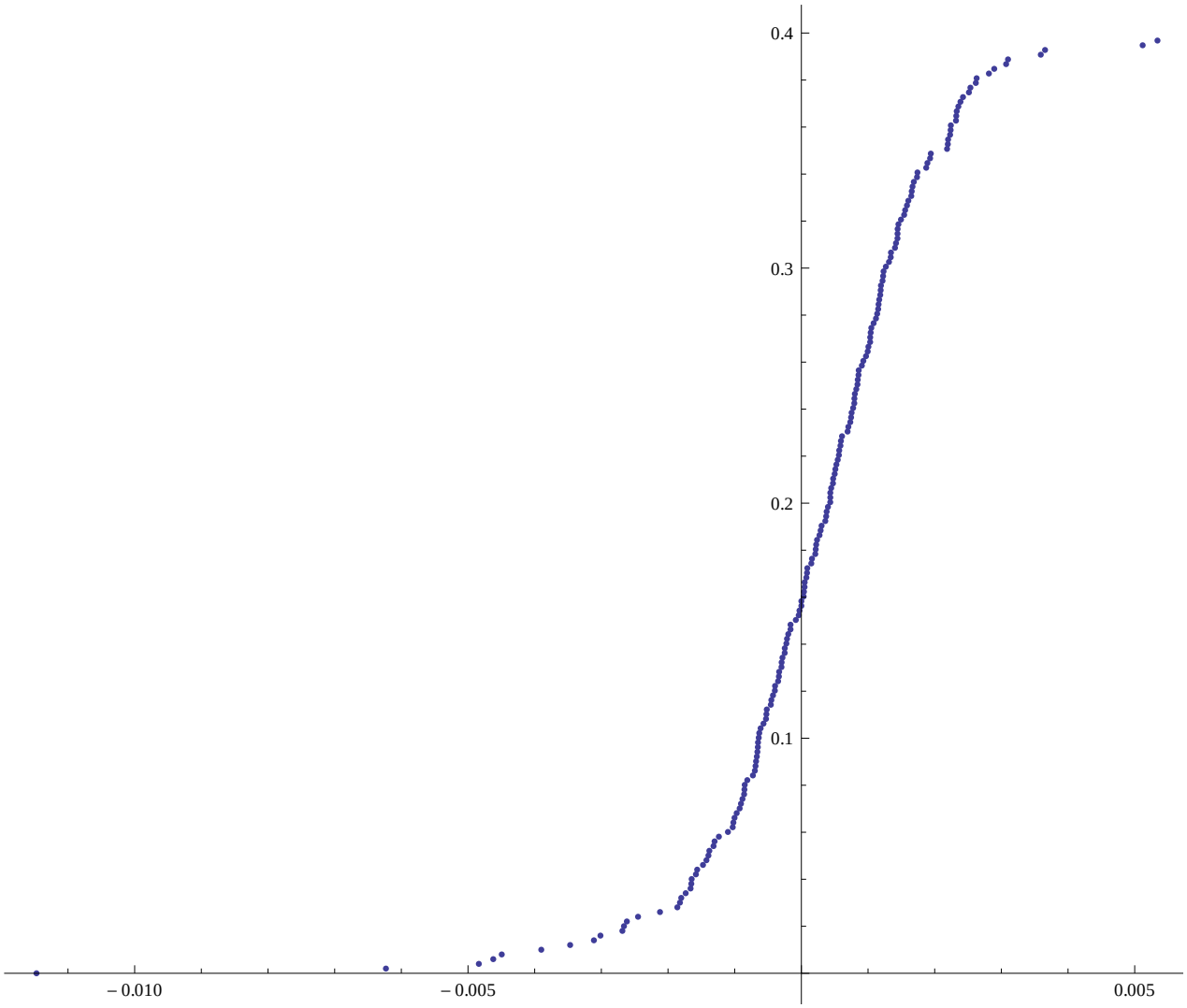
```
499
```

```
f[b_] := Transpose[Join[{Transpose[#][[1]]},
      Transpose[Table[{w[[b, 2]], i / n}, {i, 0, Length[#] - 1}]]] &[
   Sort[w[[1 ;; b]], #1[[1]] < #2[[1]] &]]
```

```
ListPlot[Transpose[w], PlotRange → All]
```

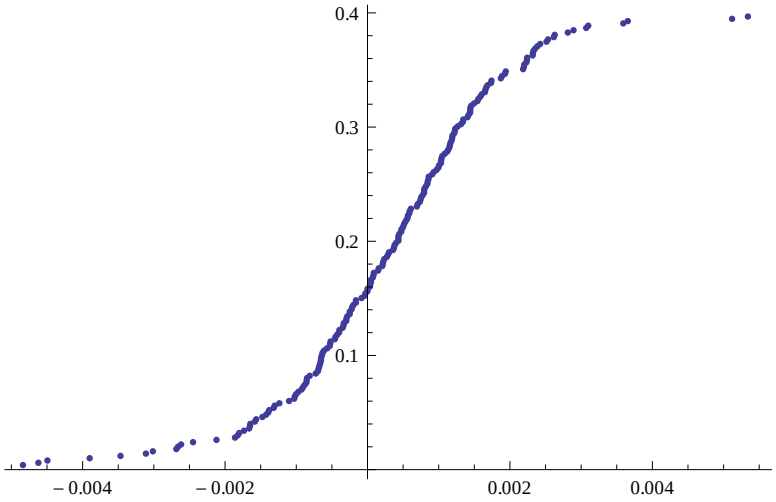


```
ListPlot[{#[[1]], #[[3]]} & /@ f[200], PlotRange → All]
```




```
h = {#[[1]], #[[3]]} & /@ f[200];
```

```
ListPlot[h]
```




```
o = 3;

y[i_, a_, b_] := {h[[i, 1]], (h[[i, 1]] – h[[i – a, 1]]) / (h[[i + b, 1]] – h[[i – a, 1]]) *
      (h[[i + b, 2]] – h[[i – a, 2]]) + h[[i – a, 2]]};

Y =.

Y[i_, o_] := Table[y[i, –4 + o, 4 + o], {i, 5 – o, Length[h] – 4 – o}];

tt = Table[y[i, –2, 2], {i, 3, Length[h] – 2}];
```

Power::infy : Infinite expression $\frac{1}{0.}$ encountered. ≫

∞::indet : Indeterminate expression 0 ComplexInfinity encountered. ≫

Power::infy : Infinite expression $\frac{1}{0.}$ encountered. ≫

∞::indet : Indeterminate expression 0 ComplexInfinity encountered. ≫

Power::infy : Infinite expression $\frac{1}{0.}$ encountered. ≫

General::stop : Further output of Power::infy will be suppressed during this calculation. ≫

∞::indet : Indeterminate expression 0 ComplexInfinity encountered. ≫

General::stop : Further output of ∞::indet will be suppressed during this calculation. ≫

```
ListPlot[Y[i, 0]]
```

Power::infy : Infinite expression $\frac{1}{0.}$ encountered. ≫

∞::indet : Indeterminate expression 0 ComplexInfinity encountered. ≫

Power::infy : Infinite expression $\frac{1}{0.}$ encountered. ≫

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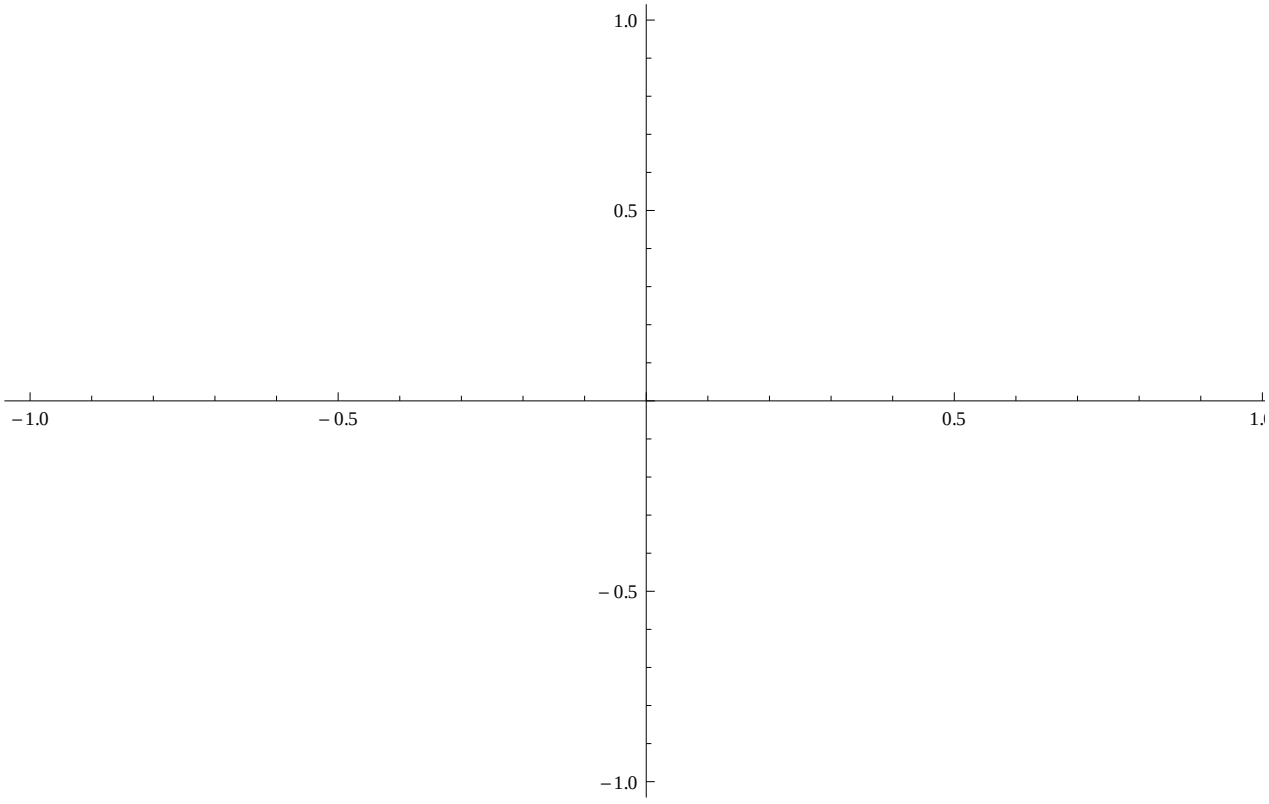
∞::indet : Indeterminate expression 0 ComplexInfinity encountered. ≫

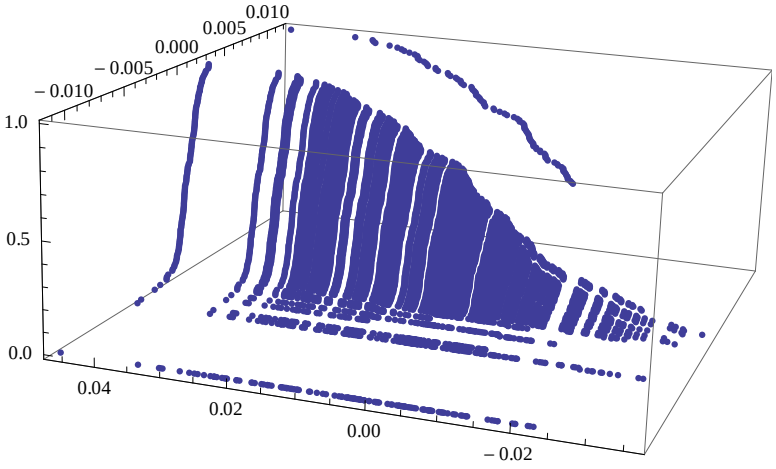
General::stop : Further output of ∞::indet will be suppressed during this calculation. ≫




```
fit = Flatten[Table[f[b], {b, n}], 1];

Length[fit]
```

11175

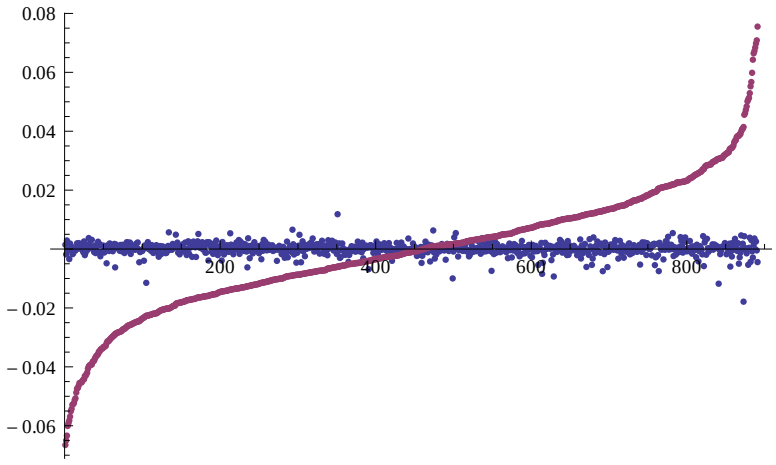
```
ListPointPlot3D[fit]
```



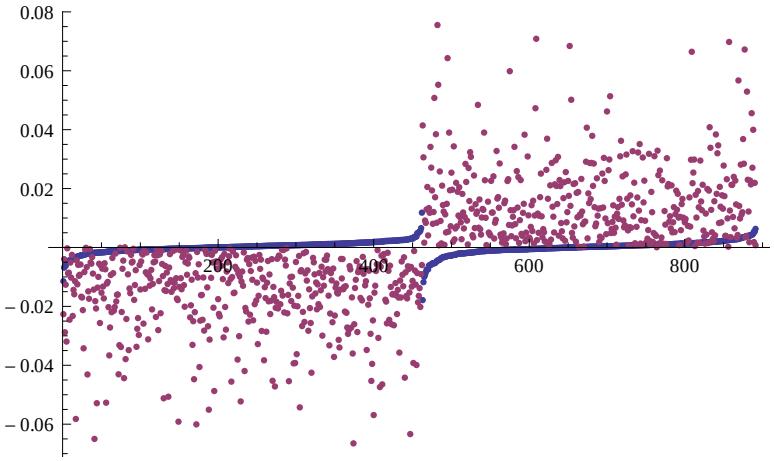

```
Log[100 000] // N
```

11.5129

```
ListPlot[Transpose[w], PlotRange → All]
```



```
ListPlot[Transpose[w2], PlotRange → All]
```




```
nN = 20; wN = Length[hedge];
m0 = Min[Transpose[w][[1]]]
Max[Transpose[w][[1]]]
m1 = Min[Transpose[w][[2]]]
Max[Transpose[w][[2]]]
f0 = (nN – 1) / (Max[Transpose[w][[1]]] – m0)
f1 = (nN – 1) / (Max[Transpose[w][[2]]] – m1)
d = 1 / wN // N
```

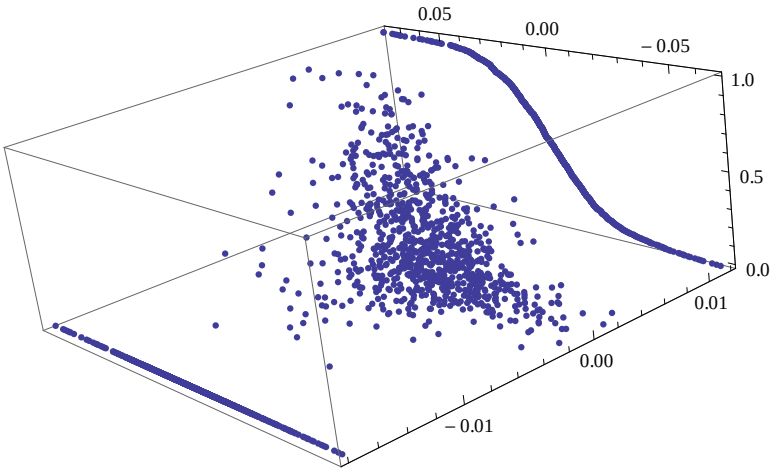
```
–0.0178719

0.0118256

–0.0665223

0.0755268

639.785

133.757

0.00112233
```

```
F = {}; For[i = 1, i ≤ wN, i++,
 For[j = 1, j ≤ wN, j++,
  m = 0;
  If[w[[j, 1]] <= w[[i, 1]]  && w[[j, 2]] ≤ w[[i, 2]], m++;];
 ];
 AppendTo[F, {w[[i, 1]], w[[i, 2]], m / wN}];
]
```

```
$Aborted
```

```
U = {}; nN = 20; For[i = 0, i ≤ nN, i++,
 AppendTo[U, {min0, i / nN * (max1 - min1) + min1, 0}];
]
For[i = 0, i ≤ nN, i++,
 AppendTo[U, {i / nN * (max0 - min0) + min0, min1, 0}];
]
For[i = 0, i ≤ nN, i++,
 AppendTo[U, {max0, i / nN * (max1 - min1) + min1,
    Length[Select[w, #[[1]] <= max0  && #[[2]] <= i / nN * (max1 - min1) + min1 &]] / wN}];
]
For[i = 0, i ≤ nN, i++,
 AppendTo[U, {i / nN * (max0 - min0) + min0, max1,
    Length[Select[w, #[[2]] <= max1  && #[[1]] <= i / nN * (max0 - min0) + min0 &]] / wN}];
]

wN = Length[hedge];
min0 = Min[Transpose[w][[1]]];
max0 = Max[Transpose[w][[1]]];
min1 = Min[Transpose[w][[2]]];
max1 = Max[Transpose[w][[2]]];

U = {}; sdax = Sort[dax]; AppendTo[U, {max0, max1, 1}];

For[i = 1, i ≤ wN, i++,
 (*AppendTo[U,{hedge[[i]],max1,(i-1)/wN}];*)
 AppendTo[U, {max0, sdax[[i]], (i - 1) / wN}];
 AppendTo[U, {min0, sdax[[i]], 0}];
]

F = {}; For[i = 1, i ≤ wN, i++,
 AppendTo[F, {w[[i, 1]], w[[i, 2]],
    Length[Select[w, #[[1]] < w[[i, 1]]  && #[[2]] < w[[i, 2]] &]] / wN}];
]

W = Join[F, U];
```

```
ListPointPlot3D[W]
```




```
ww = {};
For[i = 1, i ≤ wN, i++,
 AppendTo[ww, Select[W, #[[2]] == sdax[[i]] &]];
]

Length[W]
Length[Flatten[ww, 1]]
```

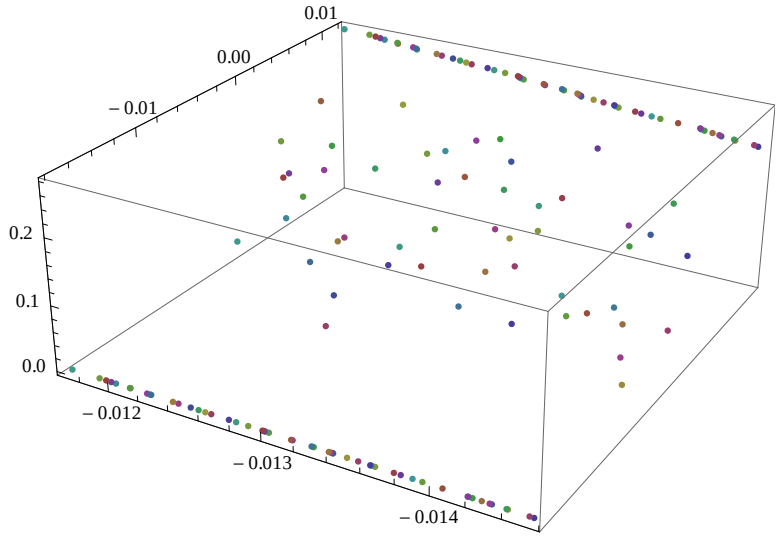
2674

2674

```
Sort[fi[[2]], #1[[1]] < #2[[1]] &] // N // MatrixForm
```

$$\begin{pmatrix} -0.0178719 & -0.0145212 & 0. \\ -0.000530372 & -0.0145212 & 0.0583614 \\ 0.0118256 & -0.0145212 & 0.224467 \end{pmatrix}$$

```
fi = ww[[200 ;; 250]];
ListPointPlot3D[fi]
```




```
Po[a_, b_] := If[b == 0, 1, If[b == -1, 0, a^b]];

B[n_, i_, x_] := Binomial[n, i] Po[x, i] Po[1 - x, n - i];

nn = Length[fi]
```

51

```
t = 0.1;

c =.

c[t0_, fi0_] := Module[{t = t0, fi = fi0, i, j, k, no, cc = {}, e}, For[i = 1, i ≤ nn, i++,
   e = Sort[fi[[i]], #1[[1]] < #2[[1]] &]; no = Length[fi[[i]]];

   For[j = 1, j ≤ no, j++,
    For[k = 1, k ≤ no - j, k++,
      e[[k]] = e[[k]] (1 - t) + e[[k + 1]] t;
     ];
   ];
   AppendTo[cc, e[[1]]];
  ];

  cc
 ]
```

```
erg[a0_, b0_, fi0_] := Module[{e = c[a0, fi0], t = b0, i, j, k, no},

  no = Length[e];

  For[j = 1, j ≤ no, j++,
   For[k = 1, k ≤ no - j, k++,
     e[[k]] = e[[k]] (1 - t) + e[[k + 1]] t;
    ];
  ];
  e[[1]]
 ]
```

```
erg[0.1, 0.1, fi]
```

```
{-0.0143759, -0.0142983, 0.0207922}
```

```
Erg = Flatten[Table[erg[x, y, fi], {x, 0, 1, 0.1}, {y, 0, 1, 0.1}], 1];
```

```
ListPointPlot3D[Erg]
```