```
Exit[];

hedge = Flatten[Import["c:\\book1.txt", "Table"], 1][[1 ;; 120]];

Length[hedge]
```

120

```
g = FinancialData["DAX", "1.1.2000"];
```

$Aborted

```
dax = Transpose[g][[2]][[1 ;; Length[hedge]]];
```

Part::partw : Part 2 of Transpose[$Failed] does not exist. ≫

Part::take : Cannot take positions 1 through 120 in Transpose[$Failed][[2]]. ≫

Part::partw : Part 2 of Transpose[$Failed] does not exist. ≫

Part::take : Cannot take positions 1 through 120 in Transpose[$Failed][[2]]. ≫

```
ListPlot[{hedge, dax}]
```

ListPlot::lpn :
{{4983.27, 4994.4, 4991.14, 4991.39, 4993.19, 4991.89, 4992.06, 4988.47, 4986.61, 4985.69, ≪110≫}
, Transpose[$Failed][[2]][[1 ;; 120]]}
is not a list of numbers or pairs of numbers.

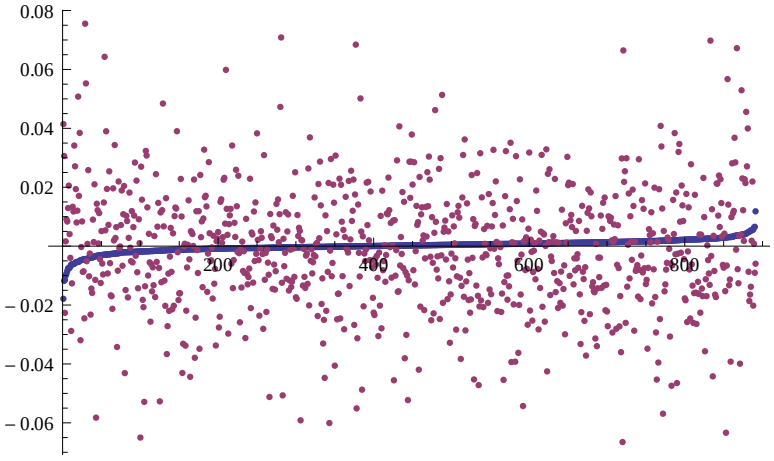
```
ListPlot[
 {{4983.27, 4994.4, 4991.14, 4991.39, 4993.19, 4991.89, 4992.06, 4988.47, 4986.61, 4985.69,
   4980.63, 4991.81, 4990.52, 4986.52, 4973.27, 4972.2, 4967.81, 4963.89, 4954.57, 4962.29,
   4968.04, 4970.61, 4968.5, 4970.1, 4962.82, 4961.34, 4957.72, 4954.05, 4952.89, 4948.64,
   4942.34, 4941.11, 4937.3, 4941.7, 4945.06, 4949.27, 4948.98, 4939.07, 4935.86, 4929.68,
   4933.51, 4936.39, 4933.98, 4945, 4949.07, 4949.2, 4949.7, 4946.89, 4943.75, 4941.06,
   4948.2, 4947.23, 4947.09, 4946.89, 4942.19, 4947.54, 4953.17, 4950.35, 4956.86,
   4958.47, 4955.3, 4957.45, 4954.88, 4957.23, 5016.2, 4958.98, 4962.73, 4959.27, 4967.31,
   4974.86, 4974.39, 4978.1, 4972.8, 4967.02, 4943.05, 4946.11, 4954.59, 4944.52,
   4944.94, 4948.56, 4955.06, 4956.84, 4955.35, 4959.7, 4955.68, 4960.65, 4969.64,
   4973.63, 4971.67, 4978.34, 4984.34, 4989.1, 4991.48, 4986.48, 4990.7, 4996.39, 5003.11,
   5001.86, 4998.68, 5001.23, 5000.52, 5005.77, 5005.48, 5008.22, 5009.07, 5013.07,
   5014.73, 5016.27, 5026.02, 5031.47, 5026.01, 5035.57, 5033.88, 5030.64, 5014.57,
   5013.18, 5011.51, 5018.63, 5023.23, 5034.22}, Transpose[$Failed][[2]][[1 ;; 120]]}]
```

```
hedge = Log[hedge]; dax = Log[dax];

hedge = Differences[hedge];

dax = Differences[dax];

w = Transpose[{hedge, dax}];

w = Sort[w, #1[[1]] < #2[[1]] &];

hedge = Transpose[w][[1]];
dax = Transpose[w][[2]];
```

```
w[[2]]
```

```
{-0.0117745, 0.0306036}
```

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




```
nN = 20;
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}];
]
```

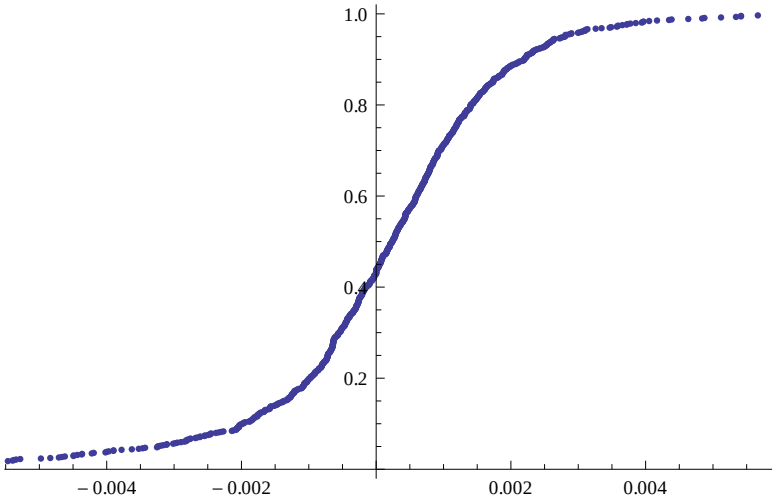
```
$Aborted
```

```
U = {}; nN = 20; wN = Length[hedge]; 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}];
]

min0 = Min[Transpose[w][[1]]]; wN = Length[hedge]; nn = wN;
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 ≤ nn, i++,
 AppendTo[U, {hedge[[i]], max1, (i - 1) / nn}];
 AppendTo[U, {max0, sdax[[i]], (i - 1) / nn}];
 AppendTo[U, {hedge[[i]], min1, 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];

F[[4]]
```

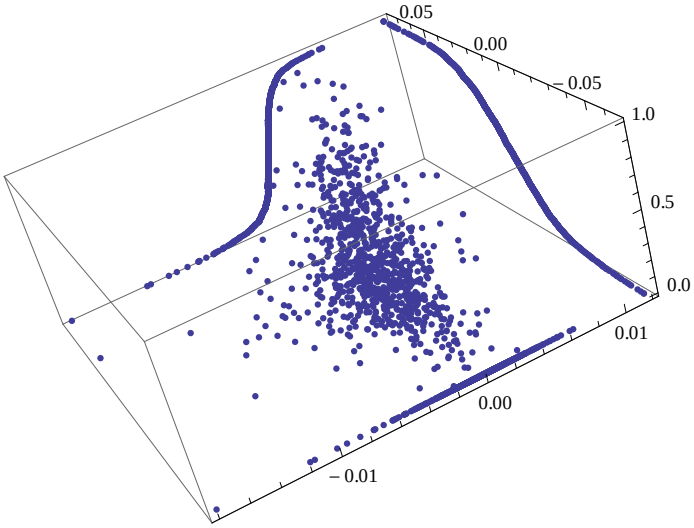
$$\left\{-0.00998299,\ 0.00162141,\ \frac{1}{891}\right\}$$

```
Co = Table[{Select[hedgeI, #[[1]] == F[[i, 1]] &][[1, 2]],
    Select[daxI, #[[1]] == F[[i, 2]] &][[1, 2]], F[[i, 3]]}, {i, Length[F]}];

hedgeI = Table[{hedge[[i]], (i - 1) / (nn - 1)}, {i, nn}];

daxI = Table[{sdax[[i]], (i - 1) / (nn - 1)}, {i, nn}];
```

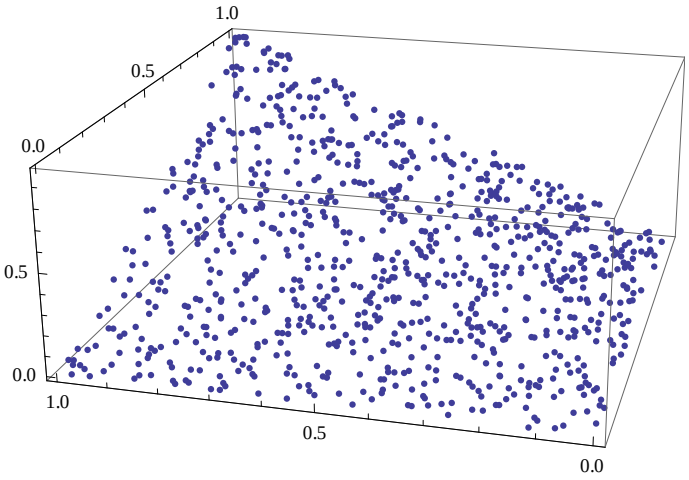
ListPlot[hedgeI]



ListPointPlot3D[W]



```
ListPointPlot3D[Co]
```




```
ww = {};
For[i = 1, i ≤ nn, i++,
 AppendTo[ww, Select[W, #[[1]] == hedge[[i]] &]];
]
```

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

2675

2759

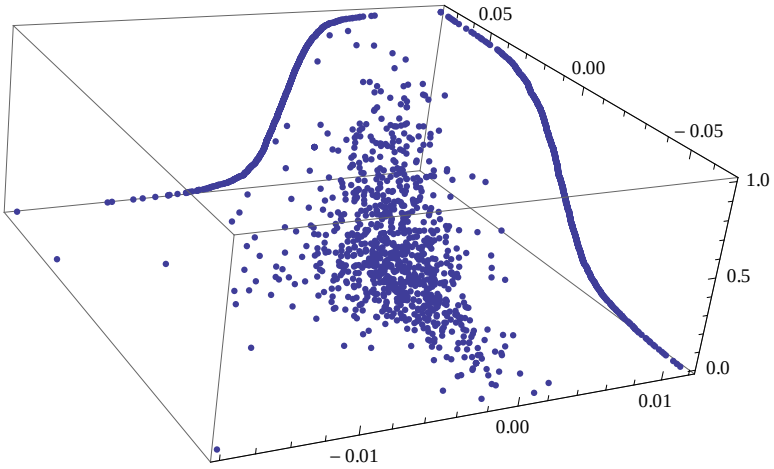
```
W[[1]]
```

$\{-0.0178719, 0.041439, 0\}$

```
ww[[9]]
```

$\left\{\left\{-0.00741427, 0.00408647, \frac{2}{891}\right\}, \left\{-0.00741427, 0.0755268, \frac{8}{891}\right\}\right\}$

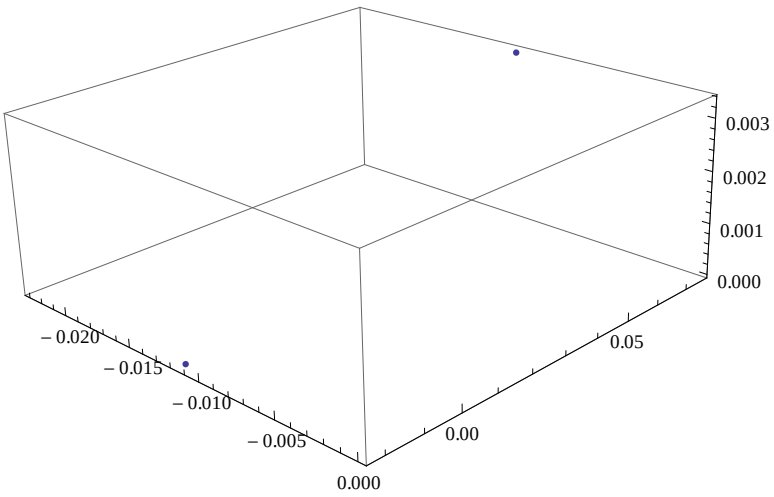
```
ListPointPlot3D[Flatten[ww, 1]]
```




```
Select[W, #[[1]] == hedge[[3]] &]
```

$$\left\{\{-0.0114726, -0.0226471, 0\}, \left\{-0.0114726, 0.0755268, \frac{2}{891}\right\}\right\}$$

```
ListPointPlot3D[Select[W, #[[1]] == hedge[[3]] &]]
```




```
w[[2]]
```

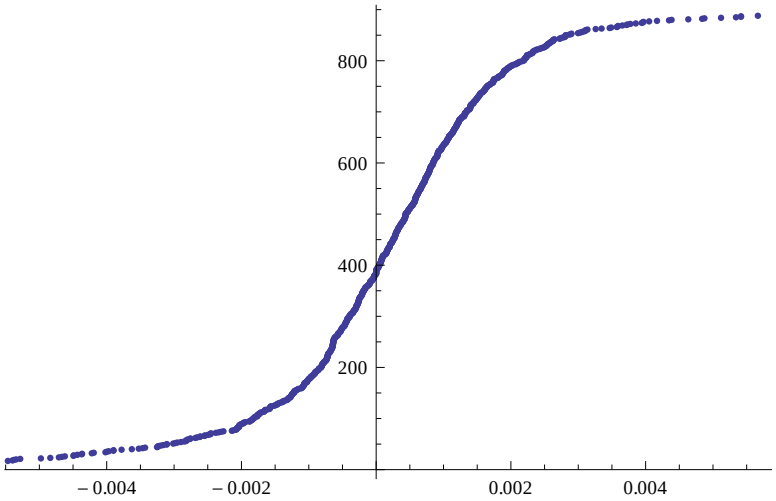
```
Length[Flatten[w, 1]]
```

891

```
Length[W]
```

4455

```
ListPlot[hrand]
```




```
nn = Length[hedge]
```

891

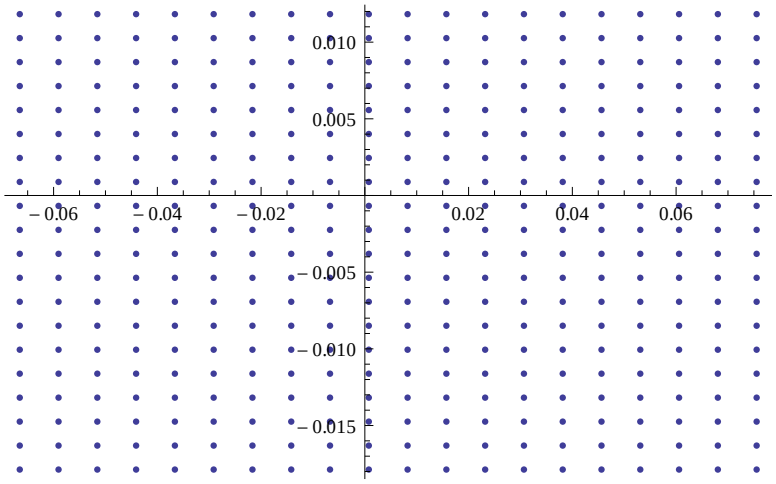
```
f = Interpolation[Join[F, U]]
```

Interpolation::indim : The coordinates do not lie on a structured tensor product grid.

```
F[[1, 1]]
```

{–0.0665223, –0.0178719, 0}

```
ListPlot[Transpose[Transpose[Q][[1 ;; 2]]]]
```

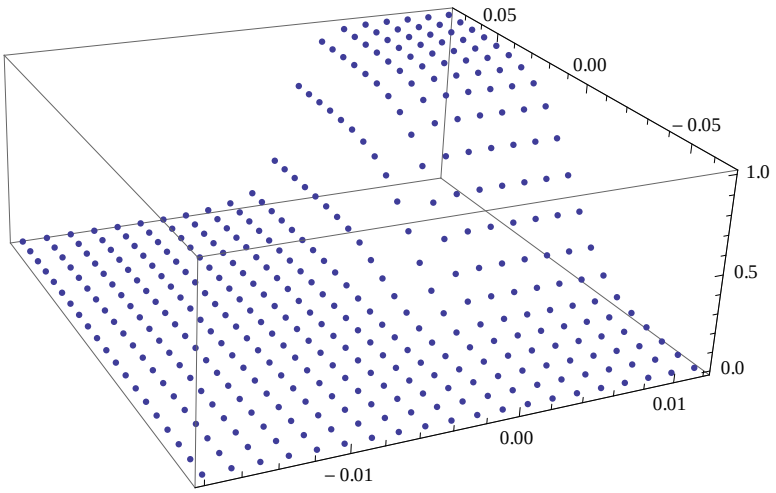



```
w[[1]]
```

{0.041439, –0.0178719}

```
F = Table[{m0 + i / f0, m1 + j / f1, 0}, {i, 0, nN - 1}, {j, 0, nN - 1}]; For[i = 1, i ≤ nN, i++,
 For[j = 1, j ≤ nN, j++,
  For[k = 1, k ≤ wN, k++,
   If[w[[k, 2]] ≤ F[[i, j, 2]] && w[[k, 1]] ≤ F[[i, j, 1]] , F[[i, j, 3]] += d;];
  ]
 ]]; Q = Flatten[F, 1];
```

```
ListPointPlot3D[Q]
```




```
w = Import["c:\\Trivariat.txt", "Table"];
```

```
Length[w]
```

```
8000
```

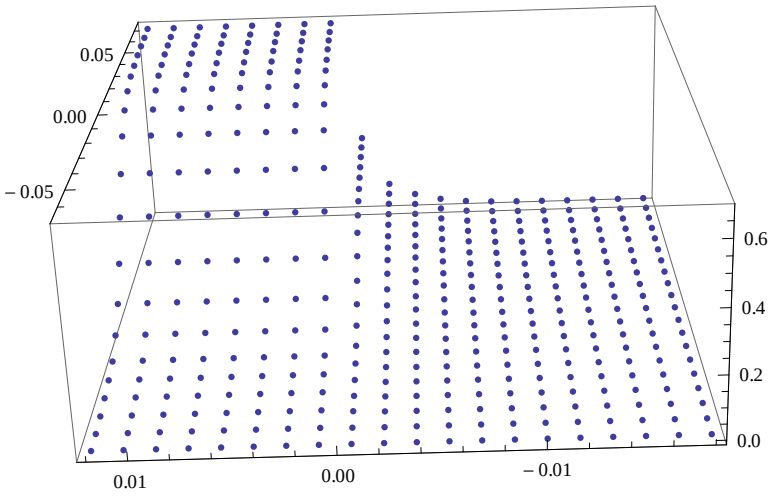
```
w[[8000]]
```

```
{0.011826, 0.075527, 0.011826, 1.}
```

```
w1 = Select[w, #[[1]] == w[[5000, 1]] &];
```

```
fif = Transpose[Transpose[w1][[2 ;; 4]]];
```

```
ListPointPlot3D[fif]
```




```
w[[3]]
```

```
{−0.017872, −0.063653, 0.}
```

```
Length[w]
```

```
10 000
```

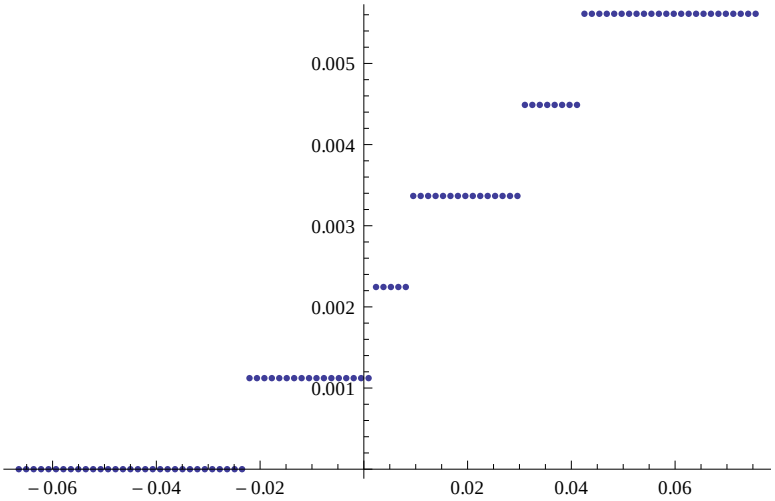
```
w[[1000, 2]]
```

```
0.075527
```

```
Table[p, {p, 1, 9999, 1000}]
```

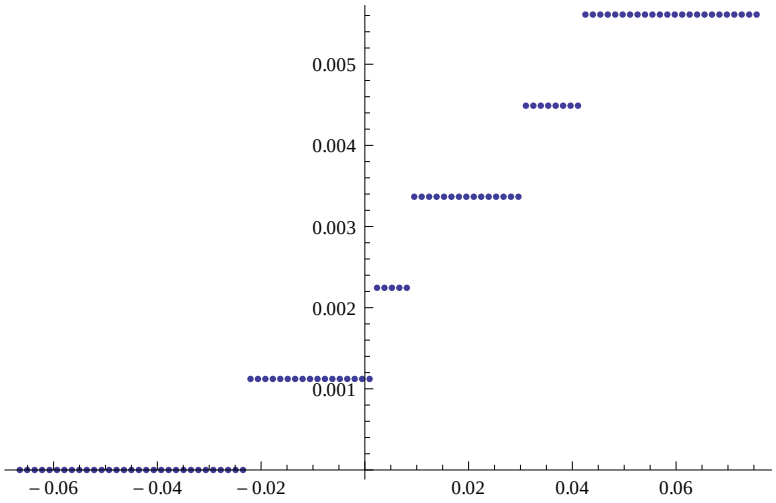
```
{1, 1001, 2001, 3001, 4001, 5001, 6001, 7001, 8001, 9001}
```

```
p = 3000; ListPlot[{#[[2]], #[[3]]} & /@ Select[w, #[[1]] == w[[p, 1]] &]]
```




```
ll = {#[[2]], #[[3]]} & /@ Select[w, #[[1]] == w[[p, 1]] &];
```

```
ListPlot[ll]
```




```
Max[Table[w[[k, 3]] - Q[[k, 3]], {k, nN^2}]]
```

4.74747×10^{-7}