In[388]:=
```
(*FastICA Negentropy Laplace *)
x = RandomVariate[LaplaceDistribution[0, 1], 10 000];
y = RandomVariate[LaplaceDistribution[0, 1], 10 000];
A = {{5, 10}, {10, 2}};
mt = A.{x, y};
```

In[437]:=
```
ma = Transpose[mt];
ListPlot[{ma[[All]]}, PlotRange → {{-50, 50}, {-50, 50}}];
```

In[394]:=
```
mt = mt - Mean[Transpose[mt]];
```

In[395]:=
```
Covariance[Transpose[mt]]
```

Out[395]=
```
{{248.34, 141.216}, {141.216, 215.299}}
```

In[396]:=
```
Eigenvalues[Covariance[Transpose[mt]]]
```

Out[396]=
```
{373.998, 89.641}
```

In[397]:=
```
Eigenvectors[Covariance[Transpose[mt]]]
```

Out[397]=
```
{{-0.74706, -0.664757}, {0.664757, -0.74706}}
```

In[398]:=
```
d12 = Eigenvalues[Covariance[Transpose[mt]]][[1]]^(-1 / 2)
d22 = Eigenvalues[Covariance[Transpose[mt]]][[2]]^(-1 / 2)
dmat = DiagonalMatrix[{d12, d22}]
```

Out[398]=
```
0.0517089
```

Out[399]=
```
0.10562
```

Out[400]=
```
{{0.0517089, 0.}, {0., 0.10562}}
```

In[401]:=
```
emat = Transpose[Eigenvectors[Covariance[Transpose[mt]]]]
```

Out[401]=
```
{{-0.74706, 0.664757}, {-0.664757, -0.74706}}
```

In[402]:=
```
vmat = emat.dmat.Transpose[emat]
```

Out[402]=
```
{{0.0755323, -0.026773}, {-0.026773, 0.0817967}}
```

In[403]:=
```
x = RandomVariate[LaplaceDistribution[0, 1], 10 000];
y = RandomVariate[LaplaceDistribution[0, 1], 10 000];
mt = A.{x, y};
mt = mt - Mean[Transpose[mt]];
```

In[407]:=
```
zmat = vmat.mt;
```

In[439]:=
```
za = Transpose[zmat];
ListPlot[{za[[All]]}, PlotRange → {{-3, 3}, {-3, 3}}];
```

In[410]:=
```
w = {1, 0};
w = w / Norm[w];
epsilon = 0.0001;
n = Length[x];
cnt = 1;
wbefore = w;
While[cnt < n,
 wbefore = w;
 w = (1 / n) * Sum[Tanh[w.zmat[[All, i]]] * zmat[[All, i]], {i, 1, n}] -
    (1 / n) * Sum[1 - (Tanh[w.zmat[[All, i]]])^2, {i, 1, n}] * w;
 w = w / Norm[w];
 Print["cnt=", cnt];
 Print["w=", w];
 ++cnt;
 If[1 - epsilon <= Abs[w.wbefore] && Abs[w.wbefore] <= 1 + epsilon,
  Print["収束した:"];
  Print["w=", w];
  Print["Abs[w.wbefore]=", Abs[w.wbefore]];
  cnt = n;
 ]
]
Kurtosis[w.zmat] - 3
```

```
cnt=1
w={-0.98548, 0.169793}
cnt=2
w={0.976347, -0.216212}
cnt=3
w={-0.973826, 0.227295}
収束した:
w={-0.973826, 0.227295}
Abs[w.wbefore]=0.999935
```

Out[417]= 2.1857

In[423]:=
```
(* True Value*)
tmat = vmat.A;
truemat = {};
i = 1;
While[i ≤ 2,
  truemat = Append[truemat, tmat[[All, i]] / Norm[tmat[[All, i]]]];
  i++;
 ];
MatrixForm[truemat]
```

Out[427]//MatrixForm=

$$\begin{pmatrix} 0.158659 & 0.987333 \\ 0.989169 & -0.146783 \end{pmatrix}$$

In[428]:=
```
w = RandomReal[{-1 / 2, 1 / 2}, 2];
w = w / Norm[w];
epsilon = 0.0001;
n = Length[x];
cnt = 1;
wbefore = w;
While[cnt < n,
 wbefore = w;
 w = (1 / n) * Sum[Tanh[w.zmat[[All, i]]] * zmat[[All, i]], {i, 1, n}] -
    (1 / n) * Sum[1 - (Tanh[w.zmat[[All, i]]])^2, {i, 1, n}] * w;
 w = w / Norm[w];
 Print["cnt=", cnt];
 Print["w=", w];
 ++cnt;
 If[1 - epsilon <= Abs[w.wbefore] && Abs[w.wbefore] <= 1 + epsilon,
  Print["収束した:"];
  Print["w=", w];
  Print["Abs[w.wbefore]=", Abs[w.wbefore]];
  cnt = n;
 ]
]
Kurtosis[w.zmat] - 3
```

```
cnt=1

w={0.974672, -0.223641}

cnt=2

w={-0.973367, 0.229253}

収束した:

w={-0.973367, 0.229253}

Abs[w.wbefore]=0.999983
```

Out[435]=
```
2.18498
```

In[436]:=
```
MatrixForm[truemat]
```

Out[436]//MatrixForm=

$$\begin{pmatrix} 0.158659 & 0.987333 \\ 0.989169 & -0.146783 \end{pmatrix}$$