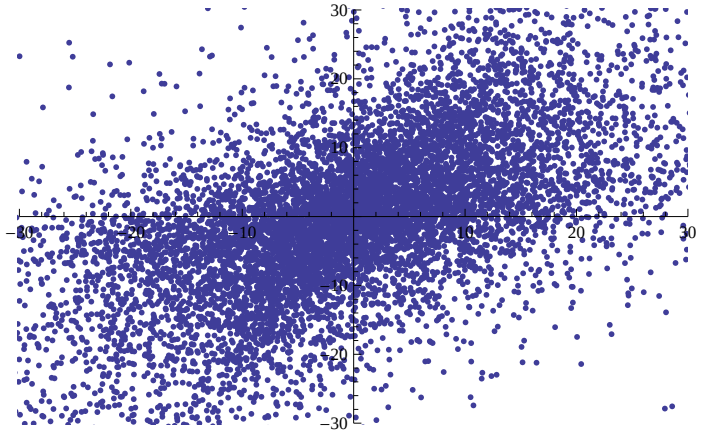
In[278]:=
```
(*FastICA Laplace *)
x = RandomVariate[LaplaceDistribution[0, 1], 10 000];
y = RandomVariate[LaplaceDistribution[0, 1], 10 000];
A = {{5, 10}, {10, 2}};
mt = A.{x, y};
mt = mt - Mean[Transpose[mt]];
```

In[283]:=
```
ma = Transpose[mt];
ListPlot[{ma[[All]]}, PlotRange → {{-30, 30}, {-30, 30}}]
```

Out[284]=



In[285]:=
```
Covariance[Transpose[mt]]
```

Out[285]=
```
{{255.234, 143.474}, {143.474, 210.658}}
```

In[286]:=
```
Eigenvalues[Covariance[Transpose[mt]]]
```

Out[286]=
```
{378.14, 87.7513}
```

In[287]:=
```
Eigenvectors[Covariance[Transpose[mt]]]
```

Out[287]=
```
{{-0.759442, -0.650575}, {0.650575, -0.759442}}
```

In[288]:=
```
d12 = 1 / Sqrt[Eigenvalues[Covariance[Transpose[mt]]][[1]]]
d22 = 1 / Sqrt[Eigenvalues[Covariance[Transpose[mt]]][[2]]]
dmat = DiagonalMatrix[{d12, d22}]
```

Out[288]=
```
0.0514249
```

Out[289]=
```
0.106751
```

Out[290]=
```
{{0.0514249, 0.}, {0., 0.106751}}
```

In[291]:=
```
emat = Transpose[Eigenvectors[Covariance[Transpose[mt]]]]
```

Out[291]=
```
{{-0.759442, 0.650575}, {-0.650575, -0.759442}}
```

In[292]:=
```
vmat = emat.dmat.Transpose[emat]
```

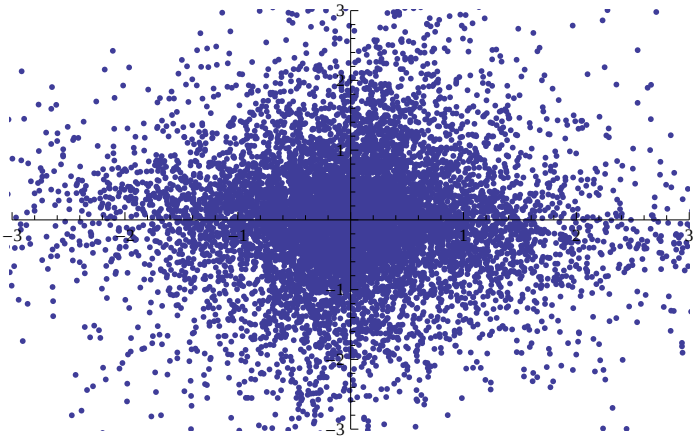
Out[292]=
```
{{0.0748417, -0.0273353}, {-0.0273353, 0.0833345}}
```

In[293]:=
```
x = RandomVariate[LaplaceDistribution[0, 1], 10 000];
y = RandomVariate[LaplaceDistribution[0, 1], 10 000];
mt = A.{x, y};
mt = mt - Mean[Transpose[mt]];
```

In[297]:=
```
zmat = vmat.mt;
```

In[298]:=
```
za = Transpose[zmat];
ListPlot[{za[[All]]}, PlotRange → {{-3, 3}, {-3, 3}}]
```

Out[299]=



In[320]:=
```
w = {1, 0};
(*w={2,20};//N*)
(*w=w/Norm[w]//N*)
epsilon = 0.00001;
n = Length[x];
cnt = 1;
wbefore = w;
While[cnt < n,
 wbefore = w;
 w = (1 / n) * Sum[((w.zmat[[All, i]])^3) * zmat[[All, i]], {i, 1, n}] - 3 * w;
 w = w / Norm[w];
 Print["cnt=", cnt];
 Print["w=", w];

 If[1 - epsilon <= Abs[w.wbefore] && Abs[w.wbefore] <= 1 + epsilon,
  Print["収束した:"];
  Print["w=", w];
  Print["cnt=", cnt];
  Print["Abs[w.wbefore]=", Abs[w.wbefore]];
  cnt = n;
 ];
 ++cnt;
]
Kurtosis[w.zmat] - 3
```

```
cnt=1

w={0.983819, -0.179163}

cnt=2

w={0.985055, -0.172242}

cnt=3

w={0.984997, -0.172574}

収束した:

w={0.984997, -0.172574}

cnt=3

Abs[w.wbefore]=1.
```

Out[326]= 3.70512

In[327]:=
```
(* True Value*)
tmat = vmat.A;
truemat = {};
i = 1;
While[i ≤ 2,
  truemat = Append[truemat, tmat[[All, i]] / Norm[tmat[[All, i]]]];
  i++;
 ];
truemat = Transpose[truemat];
MatrixForm[truemat]
```

Out[332]//MatrixForm=

$$\begin{pmatrix} 0.143274 & 0.988382 \\ 0.989683 & -0.151993 \end{pmatrix}$$

In[333]:=
```
w = RandomReal[{-Sqrt[3], Sqrt[3]}, 2];
(*w={1,0};*)

(*w={2,20};//N*)

(*w=w/Norm[w]//N*)
epsilon = 0.00001;
n = Length[x];
cnt = 1;
wbefore = w;
While[cnt < n,
 wbefore = w;
 w = (1 / n) * Sum[((w.zmat[[All, i]])^3) * zmat[[All, i]], {i, 1, n}] - 3 * w;
 w = w / Norm[w];
 Print["cnt=", cnt];
 Print["w=", w];
 If[1 - epsilon <= Abs[w.wbefore] && Abs[w.wbefore] <= 1 + epsilon,
  Print["収束した:"];
  Print["w=", w];
  Print["cnt=", cnt];
  Print["Abs[w.wbefore]=", Abs[w.wbefore]];
  cnt = n;
 ];
 ++cnt;
]
Kurtosis[w.zmat] - 3
```

```
cnt=1
w={-0.818171, 0.574974}
cnt=2
w={-0.970397, 0.241515}
cnt=3
w={-0.985478, 0.169801}
cnt=4
w={-0.984976, 0.172692}
収束した:
w={-0.984976, 0.172692}
cnt=4
Abs[w.wbefore]=0.999996
```

Out[339]= 3.70511

In[340]:= **MatrixForm[truemat]**

Out[340]//MatrixForm=

$$\begin{pmatrix} 0.143274 & 0.988382 \\ 0.989683 & -0.151993 \end{pmatrix}$$