# LinGAM

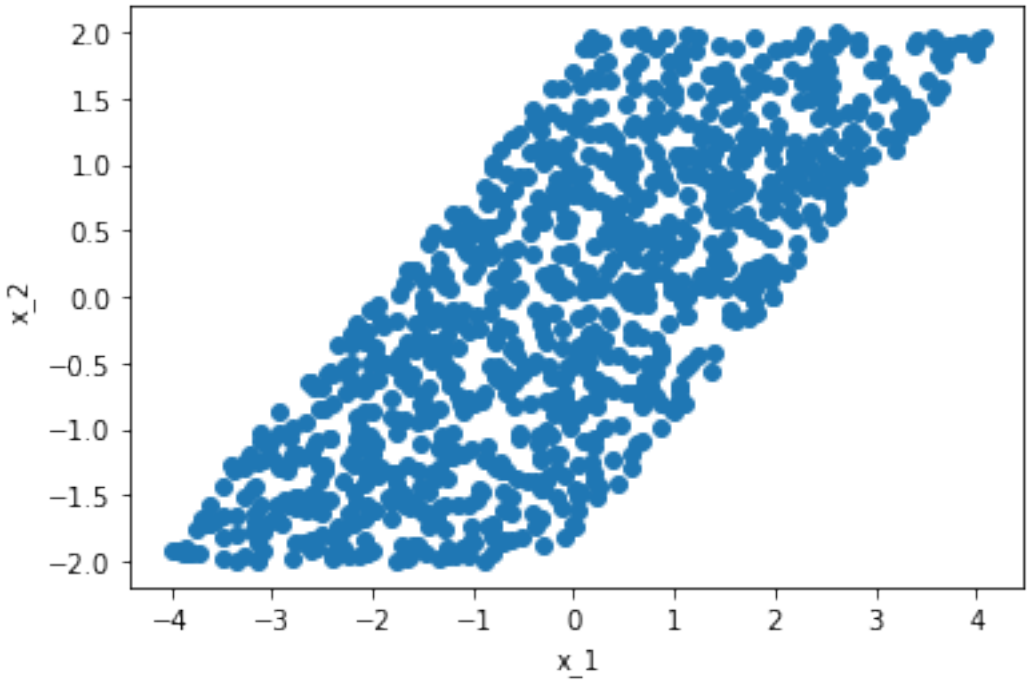
May 30, 2022

[ ]:
```
import numpy as np
import matplotlib.pyplot as plt

import warnings
warnings.simplefilter("ignore")

import lingam
```

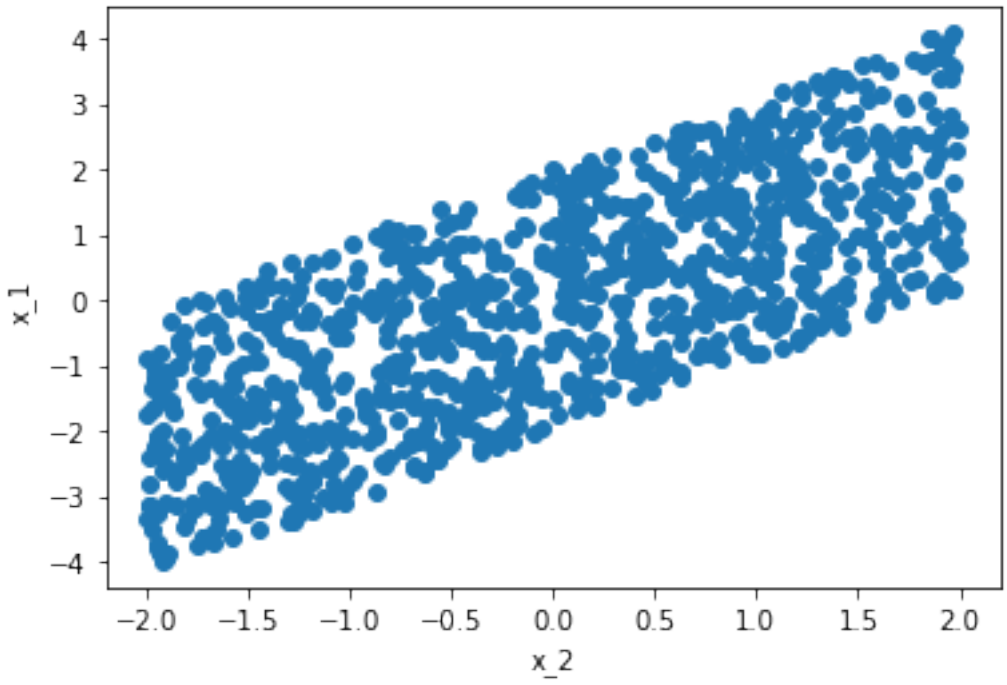
[ ]:
```
DATA_NUM = 1000
def generate_data():
  np.random.seed(777)
  x_2 = np.random.rand(DATA_NUM) * 4 - 2
  e_1 = np.random.rand(DATA_NUM) * 4 - 2
  x_1 = 1.1 * x_2 + e_1
  return x_1, x_2

def scatter(x: float, x_label: str, y: float, y_label: str):
  fig = plt.figure()
  ax = fig.add_subplot(111)
  ax.set_xlabel(x_label)
  ax.set_ylabel(y_label)
  ax.scatter(x, y)
  plt.show()
```

[ ]:
```
x_1, x_2 = generate_data()
```

[ ]:
```
scatter(x_1, "x_1", x_2, "x_2")
```




[ ]:
```
scatter(x_2, "x_2", x_1, "x_1")
```



[ ]:
```
train_data = np.r_["1", x_1.reshape(DATA_NUM,1), x_2.reshape(DATA_NUM,1)]
model = lingam.DirectLiNGAM()
model.fit(train_data)
```

[ ]:
```
<lingam.direct_lingam.DirectLiNGAM at 0x7fbf84f35be0>
```

[ ]:
```
model.adjacency_matrix_
```

[ ]:
```
array([[0.        , 1.14054417],
       [0.        , 0.        ]])
```

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<lingam.direct_lingam.DirectLiNGAM at 0x7fbf8d145eb0>
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