

Standardization operation on data set

```
In [1]: #Importing Libraries
import numpy as np
import pandas as pd
```

```
In [2]: data = pd.read_csv(r"C:\Users\prati\Desktop\Book1.csv")
data.head()
```

```
Out[2]:
```

	Min	Max	Mean	SD	Correlation
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

1.Using preprocessing.scale() function

The preprocessing.scale(data) function can be used to standardize the data values to a value having mean equivalent to zero and standard deviation as 1. Further, we have saved the iris dataset to the data object as created below.

```
In [3]: from sklearn import preprocessing
from sklearn.datasets import load_iris
data = load_iris()

# separate the independent and dependent variables
X_data = data.data
target = data.target

# standardization of dependent variables
standard = preprocessing.scale(X_data)
print(standard)
#After segregating the dependent and the response/target variable, we have applied prep
```

```
[[-9.00681170e-01  1.01900435e+00 -1.34022653e+00 -1.31544430e+00]
 [-1.14301691e+00 -1.31979479e-01 -1.34022653e+00 -1.31544430e+00]
 [-1.38535265e+00  3.28414053e-01 -1.39706395e+00 -1.31544430e+00]
 [-1.50652052e+00  9.82172869e-02 -1.28338910e+00 -1.31544430e+00]
 [-1.02184904e+00  1.24920112e+00 -1.34022653e+00 -1.31544430e+00]
 [-5.37177559e-01  1.93979142e+00 -1.16971425e+00 -1.05217993e+00]
 [-1.50652052e+00  7.88807586e-01 -1.34022653e+00 -1.18381211e+00]
 [-1.02184904e+00  7.88807586e-01 -1.28338910e+00 -1.31544430e+00]
 [-1.74885626e+00 -3.62176246e-01 -1.34022653e+00 -1.31544430e+00]
 [-1.14301691e+00  9.82172869e-02 -1.28338910e+00 -1.44707648e+00]
 [-5.37177559e-01  1.47939788e+00 -1.28338910e+00 -1.31544430e+00]
 [-1.26418478e+00  7.88807586e-01 -1.22655167e+00 -1.31544430e+00]
 [-1.26418478e+00 -1.31979479e-01 -1.34022653e+00 -1.44707648e+00]
 [-1.87002413e+00 -1.31979479e-01 -1.51073881e+00 -1.44707648e+00]
 [-5.25060772e-02  2.16998818e+00 -1.45390138e+00 -1.31544430e+00]
 [-1.73673948e-01  3.09077525e+00 -1.28338910e+00 -1.05217993e+00]
 [-5.37177559e-01  1.93979142e+00 -1.39706395e+00 -1.05217993e+00]
 [-9.00681170e-01  1.01900435e+00 -1.34022653e+00 -1.18381211e+00]
 [-1.73673948e-01  1.70959465e+00 -1.16971425e+00 -1.18381211e+00]
 [-9.00681170e-01  1.70959465e+00 -1.28338910e+00 -1.18381211e+00]
```

```
[-5.37177559e-01  7.88807586e-01 -1.16971425e+00 -1.31544430e+00]
[-9.00681170e-01  1.47939788e+00 -1.28338910e+00 -1.05217993e+00]
[-1.50652052e+00  1.24920112e+00 -1.56757623e+00 -1.31544430e+00]
[-9.00681170e-01  5.58610819e-01 -1.16971425e+00 -9.20547742e-01]
[-1.26418478e+00  7.88807586e-01 -1.05603939e+00 -1.31544430e+00]
[-1.02184904e+00 -1.31979479e-01 -1.22655167e+00 -1.31544430e+00]
[-1.02184904e+00  7.88807586e-01 -1.22655167e+00 -1.05217993e+00]
[-7.79513300e-01  1.01900435e+00 -1.28338910e+00 -1.31544430e+00]
[-7.79513300e-01  7.88807586e-01 -1.34022653e+00 -1.31544430e+00]
[-1.38535265e+00  3.28414053e-01 -1.22655167e+00 -1.31544430e+00]
[-1.26418478e+00  9.82172869e-02 -1.22655167e+00 -1.31544430e+00]
[-5.37177559e-01  7.88807586e-01 -1.28338910e+00 -1.05217993e+00]
[-7.79513300e-01  2.40018495e+00 -1.28338910e+00 -1.44707648e+00]
[-4.16009689e-01  2.63038172e+00 -1.34022653e+00 -1.31544430e+00]
[-1.14301691e+00  9.82172869e-02 -1.28338910e+00 -1.31544430e+00]
[-1.02184904e+00  3.28414053e-01 -1.45390138e+00 -1.31544430e+00]
[-4.16009689e-01  1.01900435e+00 -1.39706395e+00 -1.31544430e+00]
[-1.14301691e+00  1.24920112e+00 -1.34022653e+00 -1.44707648e+00]
[-1.74885626e+00 -1.31979479e-01 -1.39706395e+00 -1.31544430e+00]
[-9.00681170e-01  7.88807586e-01 -1.28338910e+00 -1.31544430e+00]
[-1.02184904e+00  1.01900435e+00 -1.39706395e+00 -1.18381211e+00]
[-1.62768839e+00 -1.74335684e+00 -1.39706395e+00 -1.18381211e+00]
[-1.74885626e+00  3.28414053e-01 -1.39706395e+00 -1.31544430e+00]
[-1.02184904e+00  1.01900435e+00 -1.22655167e+00 -7.88915558e-01]
[-9.00681170e-01  1.70959465e+00 -1.05603939e+00 -1.05217993e+00]
[-1.26418478e+00 -1.31979479e-01 -1.34022653e+00 -1.18381211e+00]
[-9.00681170e-01  1.70959465e+00 -1.22655167e+00 -1.31544430e+00]
[-1.50652052e+00  3.28414053e-01 -1.34022653e+00 -1.31544430e+00]
[-6.58345429e-01  1.47939788e+00 -1.28338910e+00 -1.31544430e+00]
[-1.02184904e+00  5.58610819e-01 -1.34022653e+00 -1.31544430e+00]
[ 1.40150837e+00  3.28414053e-01  5.35408562e-01  2.64141916e-01]
[ 6.74501145e-01  3.28414053e-01  4.21733708e-01  3.95774101e-01]
[ 1.28034050e+00  9.82172869e-02  6.49083415e-01  3.95774101e-01]
[-4.16009689e-01 -1.74335684e+00  1.37546573e-01  1.32509732e-01]
[ 7.95669016e-01 -5.92373012e-01  4.78571135e-01  3.95774101e-01]
[-1.73673948e-01 -5.92373012e-01  4.21733708e-01  1.32509732e-01]
[ 5.53333275e-01  5.58610819e-01  5.35408562e-01  5.27406285e-01]
[-1.14301691e+00 -1.51316008e+00 -2.60315415e-01 -2.62386821e-01]
[ 9.16836886e-01 -3.62176246e-01  4.78571135e-01  1.32509732e-01]
[-7.79513300e-01 -8.22569778e-01  8.07091462e-02  2.64141916e-01]
[-1.02184904e+00 -2.43394714e+00 -1.46640561e-01 -2.62386821e-01]
[ 6.86617933e-02 -1.31979479e-01  2.51221427e-01  3.95774101e-01]
[ 1.89829664e-01 -1.97355361e+00  1.37546573e-01 -2.62386821e-01]
[ 3.10997534e-01 -3.62176246e-01  5.35408562e-01  2.64141916e-01]
[-2.94841818e-01 -3.62176246e-01 -8.98031345e-02  1.32509732e-01]
[ 1.03800476e+00  9.82172869e-02  3.64896281e-01  2.64141916e-01]
[-2.94841818e-01 -1.31979479e-01  4.21733708e-01  3.95774101e-01]
[-5.25060772e-02 -8.22569778e-01  1.94384000e-01 -2.62386821e-01]
[ 4.32165405e-01 -1.97355361e+00  4.21733708e-01  3.95774101e-01]
[-2.94841818e-01 -1.28296331e+00  8.07091462e-02 -1.30754636e-01]
[ 6.86617933e-02  3.28414053e-01  5.92245988e-01  7.90670654e-01]
[ 3.10997534e-01 -5.92373012e-01  1.37546573e-01  1.32509732e-01]
[ 5.53333275e-01 -1.28296331e+00  6.49083415e-01  3.95774101e-01]
[ 3.10997534e-01 -5.92373012e-01  5.35408562e-01  8.77547895e-04]
[ 6.74501145e-01 -3.62176246e-01  3.08058854e-01  1.32509732e-01]
[ 9.16836886e-01 -1.31979479e-01  3.64896281e-01  2.64141916e-01]
[ 1.15917263e+00 -5.92373012e-01  5.92245988e-01  2.64141916e-01]
[ 1.03800476e+00 -1.31979479e-01  7.05920842e-01  6.59038469e-01]
[ 1.89829664e-01 -3.62176246e-01  4.21733708e-01  3.95774101e-01]
[-1.73673948e-01 -1.05276654e+00 -1.46640561e-01 -2.62386821e-01]
[-4.16009689e-01 -1.51316008e+00  2.38717193e-02 -1.30754636e-01]
[-4.16009689e-01 -1.51316008e+00 -3.29657076e-02 -2.62386821e-01]
[-5.25060772e-02 -8.22569778e-01  8.07091462e-02  8.77547895e-04]
[ 1.89829664e-01 -8.22569778e-01  7.62758269e-01  5.27406285e-01]
[-5.37177559e-01 -1.31979479e-01  4.21733708e-01  3.95774101e-01]
```

```

[ 1.89829664e-01  7.88807586e-01  4.21733708e-01  5.27406285e-01]
[ 1.03800476e+00  9.82172869e-02  5.35408562e-01  3.95774101e-01]
[ 5.53333275e-01 -1.74335684e+00  3.64896281e-01  1.32509732e-01]
[ -2.94841818e-01 -1.31979479e-01  1.94384000e-01  1.32509732e-01]
[ -4.16009689e-01 -1.28296331e+00  1.37546573e-01  1.32509732e-01]
[ -4.16009689e-01 -1.05276654e+00  3.64896281e-01  8.77547895e-04]
[ 3.10997534e-01 -1.31979479e-01  4.78571135e-01  2.64141916e-01]
[ -5.25060772e-02 -1.05276654e+00  1.37546573e-01  8.77547895e-04]
[ -1.02184904e+00 -1.74335684e+00 -2.60315415e-01 -2.62386821e-01]
[ -2.94841818e-01 -8.22569778e-01  2.51221427e-01  1.32509732e-01]
[ -1.73673948e-01 -1.31979479e-01  2.51221427e-01  8.77547895e-04]
[ -1.73673948e-01 -3.62176246e-01  2.51221427e-01  1.32509732e-01]
[ 4.32165405e-01 -3.62176246e-01  3.08058854e-01  1.32509732e-01]
[ -9.00681170e-01 -1.28296331e+00 -4.30827696e-01 -1.30754636e-01]
[ -1.73673948e-01 -5.92373012e-01  1.94384000e-01  1.32509732e-01]
[ 5.53333275e-01  5.58610819e-01  1.27429511e+00  1.71209594e+00]
[ -5.25060772e-02 -8.22569778e-01  7.62758269e-01  9.22302838e-01]
[ 1.52267624e+00 -1.31979479e-01  1.21745768e+00  1.18556721e+00]
[ 5.53333275e-01 -3.62176246e-01  1.04694540e+00  7.90670654e-01]
[ 7.95669016e-01 -1.31979479e-01  1.16062026e+00  1.31719939e+00]
[ 2.12851559e+00 -1.31979479e-01  1.61531967e+00  1.18556721e+00]
[ -1.14301691e+00 -1.28296331e+00  4.21733708e-01  6.59038469e-01]
[ 1.76501198e+00 -3.62176246e-01  1.44480739e+00  7.90670654e-01]
[ 1.03800476e+00 -1.28296331e+00  1.16062026e+00  7.90670654e-01]
[ 1.64384411e+00  1.24920112e+00  1.33113254e+00  1.71209594e+00]
[ 7.95669016e-01  3.28414053e-01  7.62758269e-01  1.05393502e+00]
[ 6.74501145e-01 -8.22569778e-01  8.76433123e-01  9.22302838e-01]
[ 1.15917263e+00 -1.31979479e-01  9.90107977e-01  1.18556721e+00]
[ -1.73673948e-01 -1.28296331e+00  7.05920842e-01  1.05393502e+00]
[ -5.25060772e-02 -5.92373012e-01  7.62758269e-01  1.58046376e+00]
[ 6.74501145e-01  3.28414053e-01  8.76433123e-01  1.44883158e+00]
[ 7.95669016e-01 -1.31979479e-01  9.90107977e-01  7.90670654e-01]
[ 2.24968346e+00  1.70959465e+00  1.67215710e+00  1.31719939e+00]
[ 2.24968346e+00 -1.05276654e+00  1.78583195e+00  1.44883158e+00]
[ 1.89829664e-01 -1.97355361e+00  7.05920842e-01  3.95774101e-01]
[ 1.28034050e+00  3.28414053e-01  1.10378283e+00  1.44883158e+00]
[ -2.94841818e-01 -5.92373012e-01  6.49083415e-01  1.05393502e+00]
[ 2.24968346e+00 -5.92373012e-01  1.67215710e+00  1.05393502e+00]
[ 5.53333275e-01 -8.22569778e-01  6.49083415e-01  7.90670654e-01]
[ 1.03800476e+00  5.58610819e-01  1.10378283e+00  1.18556721e+00]
[ 1.64384411e+00  3.28414053e-01  1.27429511e+00  7.90670654e-01]
[ 4.32165405e-01 -5.92373012e-01  5.92245988e-01  7.90670654e-01]
[ 3.10997534e-01 -1.31979479e-01  6.49083415e-01  7.90670654e-01]
[ 6.74501145e-01 -5.92373012e-01  1.04694540e+00  1.18556721e+00]
[ 1.64384411e+00 -1.31979479e-01  1.16062026e+00  5.27406285e-01]
[ 1.88617985e+00 -5.92373012e-01  1.33113254e+00  9.22302838e-01]
[ 2.49201920e+00  1.70959465e+00  1.50164482e+00  1.05393502e+00]
[ 6.74501145e-01 -5.92373012e-01  1.04694540e+00  1.31719939e+00]
[ 5.53333275e-01 -5.92373012e-01  7.62758269e-01  3.95774101e-01]
[ 3.10997534e-01 -1.05276654e+00  1.04694540e+00  2.64141916e-01]
[ 2.24968346e+00 -1.31979479e-01  1.33113254e+00  1.44883158e+00]
[ 5.53333275e-01  7.88807586e-01  1.04694540e+00  1.58046376e+00]
[ 6.74501145e-01  9.82172869e-02  9.90107977e-01  7.90670654e-01]
[ 1.89829664e-01 -1.31979479e-01  5.92245988e-01  7.90670654e-01]
[ 1.28034050e+00  9.82172869e-02  9.33270550e-01  1.18556721e+00]
[ 1.03800476e+00  9.82172869e-02  1.04694540e+00  1.58046376e+00]
[ 1.28034050e+00  9.82172869e-02  7.62758269e-01  1.44883158e+00]
[ -5.25060772e-02 -8.22569778e-01  7.62758269e-01  9.22302838e-01]
[ 1.15917263e+00  3.28414053e-01  1.21745768e+00  1.44883158e+00]
[ 1.03800476e+00  5.58610819e-01  1.10378283e+00  1.71209594e+00]
[ 1.03800476e+00 -1.31979479e-01  8.19595696e-01  1.44883158e+00]
[ 5.53333275e-01 -1.28296331e+00  7.05920842e-01  9.22302838e-01]
[ 7.95669016e-01 -1.31979479e-01  8.19595696e-01  1.05393502e+00]
[ 4.32165405e-01  7.88807586e-01  9.33270550e-01  1.44883158e+00]
[ 6.86617933e-02 -1.31979479e-01  7.62758269e-01  7.90670654e-01]

```

2.Using StandardScaler()

Python sklearn library offers us with StandardScaler() function to perform standardization on the dataset.

Here, again we have made use of Iris dataset.

Further, we have created an object of StandardScaler() and then applied fit_transform() function to apply standardization on the dataset.

```
In [4]: from sklearn.datasets import load_iris
from sklearn.preprocessing import StandardScaler

data = load_iris()
scale= StandardScaler()

# separate the independent and dependent variables
X_data = data.data
target = data.target

# standardization of dependent variables
scaled_data = scale.fit_transform(X_data)
print(scaled_data)
```

```
[[-9.00681170e-01  1.01900435e+00 -1.34022653e+00 -1.31544430e+00]
 [-1.14301691e+00 -1.31979479e-01 -1.34022653e+00 -1.31544430e+00]
 [-1.38535265e+00  3.28414053e-01 -1.39706395e+00 -1.31544430e+00]
 [-1.50652052e+00  9.82172869e-02 -1.28338910e+00 -1.31544430e+00]
 [-1.02184904e+00  1.24920112e+00 -1.34022653e+00 -1.31544430e+00]
 [-5.37177559e-01  1.93979142e+00 -1.16971425e+00 -1.05217993e+00]
 [-1.50652052e+00  7.88807586e-01 -1.34022653e+00 -1.18381211e+00]
 [-1.02184904e+00  7.88807586e-01 -1.28338910e+00 -1.31544430e+00]
 [-1.74885626e+00 -3.62176246e-01 -1.34022653e+00 -1.31544430e+00]
 [-1.14301691e+00  9.82172869e-02 -1.28338910e+00 -1.44707648e+00]
 [-5.37177559e-01  1.47939788e+00 -1.28338910e+00 -1.31544430e+00]
 [-1.26418478e+00  7.88807586e-01 -1.22655167e+00 -1.31544430e+00]
 [-1.26418478e+00 -1.31979479e-01 -1.34022653e+00 -1.44707648e+00]
 [-1.87002413e+00 -1.31979479e-01 -1.51073881e+00 -1.44707648e+00]
 [-5.25060772e-02  2.16998818e+00 -1.45390138e+00 -1.31544430e+00]
 [-1.73673948e-01  3.09077525e+00 -1.28338910e+00 -1.05217993e+00]
 [-5.37177559e-01  1.93979142e+00 -1.39706395e+00 -1.05217993e+00]
 [-9.00681170e-01  1.01900435e+00 -1.34022653e+00 -1.18381211e+00]
 [-1.73673948e-01  1.70959465e+00 -1.16971425e+00 -1.18381211e+00]
 [-9.00681170e-01  1.70959465e+00 -1.28338910e+00 -1.18381211e+00]
 [-5.37177559e-01  7.88807586e-01 -1.16971425e+00 -1.31544430e+00]
 [-9.00681170e-01  1.47939788e+00 -1.28338910e+00 -1.05217993e+00]
 [-1.50652052e+00  1.24920112e+00 -1.56757623e+00 -1.31544430e+00]
 [-9.00681170e-01  5.58610819e-01 -1.16971425e+00 -9.20547742e-01]
 [-1.26418478e+00  7.88807586e-01 -1.05603939e+00 -1.31544430e+00]
 [-1.02184904e+00 -1.31979479e-01 -1.22655167e+00 -1.31544430e+00]
 [-1.02184904e+00  7.88807586e-01 -1.22655167e+00 -1.05217993e+00]
 [-7.79513300e-01  1.01900435e+00 -1.28338910e+00 -1.31544430e+00]
 [-7.79513300e-01  7.88807586e-01 -1.34022653e+00 -1.31544430e+00]
 [-1.38535265e+00  3.28414053e-01 -1.22655167e+00 -1.31544430e+00]
 [-1.26418478e+00  9.82172869e-02 -1.22655167e+00 -1.31544430e+00]
 [-5.37177559e-01  7.88807586e-01 -1.28338910e+00 -1.05217993e+00]
 [-7.79513300e-01  2.40018495e+00 -1.28338910e+00 -1.44707648e+00]
 [-4.16009689e-01  2.63038172e+00 -1.34022653e+00 -1.31544430e+00]
 [-1.14301691e+00  9.82172869e-02 -1.28338910e+00 -1.31544430e+00]
 [-1.02184904e+00  3.28414053e-01 -1.45390138e+00 -1.31544430e+00]
 [-4.16009689e-01  1.01900435e+00 -1.39706395e+00 -1.31544430e+00]
```

```
[-1.14301691e+00 1.24920112e+00 -1.34022653e+00 -1.44707648e+00]
[-1.74885626e+00 -1.31979479e-01 -1.39706395e+00 -1.31544430e+00]
[-9.00681170e-01 7.88807586e-01 -1.28338910e+00 -1.31544430e+00]
[-1.02184904e+00 1.01900435e+00 -1.39706395e+00 -1.18381211e+00]
[-1.62768839e+00 -1.74335684e+00 -1.39706395e+00 -1.18381211e+00]
[-1.74885626e+00 3.28414053e-01 -1.39706395e+00 -1.31544430e+00]
[-1.02184904e+00 1.01900435e+00 -1.22655167e+00 -7.88915558e-01]
[-9.00681170e-01 1.70959465e+00 -1.05603939e+00 -1.05217993e+00]
[-1.26418478e+00 -1.31979479e-01 -1.34022653e+00 -1.18381211e+00]
[-9.00681170e-01 1.70959465e+00 -1.22655167e+00 -1.31544430e+00]
[-1.50652052e+00 3.28414053e-01 -1.34022653e+00 -1.31544430e+00]
[-6.58345429e-01 1.47939788e+00 -1.28338910e+00 -1.31544430e+00]
[-1.02184904e+00 5.58610819e-01 -1.34022653e+00 -1.31544430e+00]
[ 1.40150837e+00 3.28414053e-01 5.35408562e-01 2.64141916e-01]
[ 6.74501145e-01 3.28414053e-01 4.21733708e-01 3.95774101e-01]
[ 1.28034050e+00 9.82172869e-02 6.49083415e-01 3.95774101e-01]
[-4.16009689e-01 -1.74335684e+00 1.37546573e-01 1.32509732e-01]
[ 7.95669016e-01 -5.92373012e-01 4.78571135e-01 3.95774101e-01]
[-1.73673948e-01 -5.92373012e-01 4.21733708e-01 1.32509732e-01]
[ 5.53333275e-01 5.58610819e-01 5.35408562e-01 5.27406285e-01]
[-1.14301691e+00 -1.51316008e+00 -2.60315415e-01 -2.62386821e-01]
[ 9.16836886e-01 -3.62176246e-01 4.78571135e-01 1.32509732e-01]
[-7.79513300e-01 -8.22569778e-01 8.07091462e-02 2.64141916e-01]
[-1.02184904e+00 -2.43394714e+00 -1.46640561e-01 -2.62386821e-01]
[ 6.86617933e-02 -1.31979479e-01 2.51221427e-01 3.95774101e-01]
[ 1.89829664e-01 -1.97355361e+00 1.37546573e-01 -2.62386821e-01]
[ 3.10997534e-01 -3.62176246e-01 5.35408562e-01 2.64141916e-01]
[-2.94841818e-01 -3.62176246e-01 -8.98031345e-02 1.32509732e-01]
[ 1.03800476e+00 9.82172869e-02 3.64896281e-01 2.64141916e-01]
[-2.94841818e-01 -1.31979479e-01 4.21733708e-01 3.95774101e-01]
[-5.25060772e-02 -8.22569778e-01 1.94384000e-01 -2.62386821e-01]
[ 4.32165405e-01 -1.97355361e+00 4.21733708e-01 3.95774101e-01]
[-2.94841818e-01 -1.28296331e+00 8.07091462e-02 -1.30754636e-01]
[ 6.86617933e-02 3.28414053e-01 5.92245988e-01 7.90670654e-01]
[ 3.10997534e-01 -5.92373012e-01 1.37546573e-01 1.32509732e-01]
[ 5.53333275e-01 -1.28296331e+00 6.49083415e-01 3.95774101e-01]
[ 3.10997534e-01 -5.92373012e-01 5.35408562e-01 8.77547895e-04]
[ 6.74501145e-01 -3.62176246e-01 3.08058854e-01 1.32509732e-01]
[ 9.16836886e-01 -1.31979479e-01 3.64896281e-01 2.64141916e-01]
[ 1.15917263e+00 -5.92373012e-01 5.92245988e-01 2.64141916e-01]
[ 1.03800476e+00 -1.31979479e-01 7.05920842e-01 6.59038469e-01]
[ 1.89829664e-01 -3.62176246e-01 4.21733708e-01 3.95774101e-01]
[-1.73673948e-01 -1.05276654e+00 -1.46640561e-01 -2.62386821e-01]
[-4.16009689e-01 -1.51316008e+00 2.38717193e-02 -1.30754636e-01]
[-4.16009689e-01 -1.51316008e+00 -3.29657076e-02 -2.62386821e-01]
[-5.25060772e-02 -8.22569778e-01 8.07091462e-02 8.77547895e-04]
[ 1.89829664e-01 -8.22569778e-01 7.62758269e-01 5.27406285e-01]
[-5.37177559e-01 -1.31979479e-01 4.21733708e-01 3.95774101e-01]
[ 1.89829664e-01 7.88807586e-01 4.21733708e-01 5.27406285e-01]
[ 1.03800476e+00 9.82172869e-02 5.35408562e-01 3.95774101e-01]
[ 5.53333275e-01 -1.74335684e+00 3.64896281e-01 1.32509732e-01]
[-2.94841818e-01 -1.31979479e-01 1.94384000e-01 1.32509732e-01]
[-4.16009689e-01 -1.28296331e+00 1.37546573e-01 1.32509732e-01]
[-4.16009689e-01 -1.05276654e+00 3.64896281e-01 8.77547895e-04]
[ 3.10997534e-01 -1.31979479e-01 4.78571135e-01 2.64141916e-01]
[-5.25060772e-02 -1.05276654e+00 1.37546573e-01 8.77547895e-04]
[-1.02184904e+00 -1.74335684e+00 -2.60315415e-01 -2.62386821e-01]
[-2.94841818e-01 -8.22569778e-01 2.51221427e-01 1.32509732e-01]
[-1.73673948e-01 -1.31979479e-01 2.51221427e-01 8.77547895e-04]
[-1.73673948e-01 -3.62176246e-01 2.51221427e-01 1.32509732e-01]
[ 4.32165405e-01 -3.62176246e-01 3.08058854e-01 1.32509732e-01]
[-9.00681170e-01 -1.28296331e+00 -4.30827696e-01 -1.30754636e-01]
[-1.73673948e-01 -5.92373012e-01 1.94384000e-01 1.32509732e-01]
[ 5.53333275e-01 5.58610819e-01 1.27429511e+00 1.71209594e+00]
[-5.25060772e-02 -8.22569778e-01 7.62758269e-01 9.22302838e-01]
```

```
[ 1.52267624e+00 -1.31979479e-01 1.21745768e+00 1.18556721e+00]
[ 5.53333275e-01 -3.62176246e-01 1.04694540e+00 7.90670654e-01]
[ 7.95669016e-01 -1.31979479e-01 1.16062026e+00 1.31719939e+00]
[ 2.12851559e+00 -1.31979479e-01 1.61531967e+00 1.18556721e+00]
[-1.14301691e+00 -1.28296331e+00 4.21733708e-01 6.59038469e-01]
[ 1.76501198e+00 -3.62176246e-01 1.44480739e+00 7.90670654e-01]
[ 1.03800476e+00 -1.28296331e+00 1.16062026e+00 7.90670654e-01]
[ 1.64384411e+00 1.24920112e+00 1.33113254e+00 1.71209594e+00]
[ 7.95669016e-01 3.28414053e-01 7.62758269e-01 1.05393502e+00]
[ 6.74501145e-01 -8.22569778e-01 8.76433123e-01 9.22302838e-01]
[ 1.15917263e+00 -1.31979479e-01 9.90107977e-01 1.18556721e+00]
[-1.73673948e-01 -1.28296331e+00 7.05920842e-01 1.05393502e+00]
[-5.25060772e-02 -5.92373012e-01 7.62758269e-01 1.58046376e+00]
[ 6.74501145e-01 3.28414053e-01 8.76433123e-01 1.44883158e+00]
[ 7.95669016e-01 -1.31979479e-01 9.90107977e-01 7.90670654e-01]
[ 2.24968346e+00 1.70959465e+00 1.67215710e+00 1.31719939e+00]
[ 2.24968346e+00 -1.05276654e+00 1.78583195e+00 1.44883158e+00]
[ 1.89829664e-01 -1.97355361e+00 7.05920842e-01 3.95774101e-01]
[ 1.28034050e+00 3.28414053e-01 1.10378283e+00 1.44883158e+00]
[-2.94841818e-01 -5.92373012e-01 6.49083415e-01 1.05393502e+00]
[ 2.24968346e+00 -5.92373012e-01 1.67215710e+00 1.05393502e+00]
[ 5.53333275e-01 -8.22569778e-01 6.49083415e-01 7.90670654e-01]
[ 1.03800476e+00 5.58610819e-01 1.10378283e+00 1.18556721e+00]
[ 1.64384411e+00 3.28414053e-01 1.27429511e+00 7.90670654e-01]
[ 4.32165405e-01 -5.92373012e-01 5.92245988e-01 7.90670654e-01]
[ 3.10997534e-01 -1.31979479e-01 6.49083415e-01 7.90670654e-01]
[ 6.74501145e-01 -5.92373012e-01 1.04694540e+00 1.18556721e+00]
[ 1.64384411e+00 -1.31979479e-01 1.16062026e+00 5.27406285e-01]
[ 1.88617985e+00 -5.92373012e-01 1.33113254e+00 9.22302838e-01]
[ 2.49201920e+00 1.70959465e+00 1.50164482e+00 1.05393502e+00]
[ 6.74501145e-01 -5.92373012e-01 1.04694540e+00 1.31719939e+00]
[ 5.53333275e-01 -5.92373012e-01 7.62758269e-01 3.95774101e-01]
[ 3.10997534e-01 -1.05276654e+00 1.04694540e+00 2.64141916e-01]
[ 2.24968346e+00 -1.31979479e-01 1.33113254e+00 1.44883158e+00]
[ 5.53333275e-01 7.88807586e-01 1.04694540e+00 1.58046376e+00]
[ 6.74501145e-01 9.82172869e-02 9.90107977e-01 7.90670654e-01]
[ 1.89829664e-01 -1.31979479e-01 5.92245988e-01 7.90670654e-01]
[ 1.28034050e+00 9.82172869e-02 9.33270550e-01 1.18556721e+00]
[ 1.03800476e+00 9.82172869e-02 1.04694540e+00 1.58046376e+00]
[ 1.28034050e+00 9.82172869e-02 7.62758269e-01 1.44883158e+00]
[-5.25060772e-02 -8.22569778e-01 7.62758269e-01 9.22302838e-01]
[ 1.15917263e+00 3.28414053e-01 1.21745768e+00 1.44883158e+00]
[ 1.03800476e+00 5.58610819e-01 1.10378283e+00 1.71209594e+00]
[ 1.03800476e+00 -1.31979479e-01 8.19595696e-01 1.44883158e+00]
[ 5.53333275e-01 -1.28296331e+00 7.05920842e-01 9.22302838e-01]
[ 7.95669016e-01 -1.31979479e-01 8.19595696e-01 1.05393502e+00]
[ 4.32165405e-01 7.88807586e-01 9.33270550e-01 1.44883158e+00]
[ 6.86617933e-02 -1.31979479e-01 7.62758269e-01 7.90670654e-01]]
```

In []: