An Example Run for MoMPCA

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Load the libraries required and load the file, "functions.R", which contains the MoMPCA frunction.

```
library(RSpectra)
```

```
## Warning: package 'RSpectra' was built under R version 4.0.3
```

```
library(pracma)
source('function.R')
```

Load the data as follows.

```
X=read.csv('motivating_example.csv')
X=data.matrix(X)
```

Run the MoMPCA function to find the first principal component. We take $L = 25$.

```
l=MoMPCA(X,L=25,d=1,eta=0.0001,tmax=100,verbose=1)
```

```
## Iteration no: 20
## Iteration no: 40
## Iteration no: 60
## Iteration no: 80
## Iteration no: 100
```

We plot the scatter plot of the data along the PC1 for MoMPCA (colored in blue) and classical PCA (colored in red) in Figure 1. Even in the presence of only 1% outlying observations, the classical PCA can render spurious results while MoM PCA finds the direction of maximum variation efficiently.

Figure 1: MoMPCA vs. Classical PCA