

# Data Science Masters :Assignment 10

Scipy:

We have the min and max temperatures in a city In India for each months of the year. We would like to find a function to describe this and show it graphically, the dataset given below.

Task:

1. fitting it to the periodic function
2. plot the fit

Data

Max = 39, 41, 43, 47, 49, 51, 45, 38, 37, 29, 27, 25

Min = 21, 23, 27, 28, 32, 35, 31, 28, 21, 19, 17, 18

In [4]:

```

# Solution..
# Importing Libraries
import numpy as np
import matplotlib.pyplot as plt
from scipy import optimize

# Assigning x axis and y axis date and month sequence
xData = np.linspace(-5, 5, num=50)
yData = 2.9 * np.sin(1.5 * xData) + np.random.normal(size=50)
months = np.arange(12)

# Defining a function to do curve fitting
def periodicFunction(x, a, b):
    return a * np.sin(b * x)

params, params_covariance = optimize.curve_fit(periodicFunction, xData, yData)

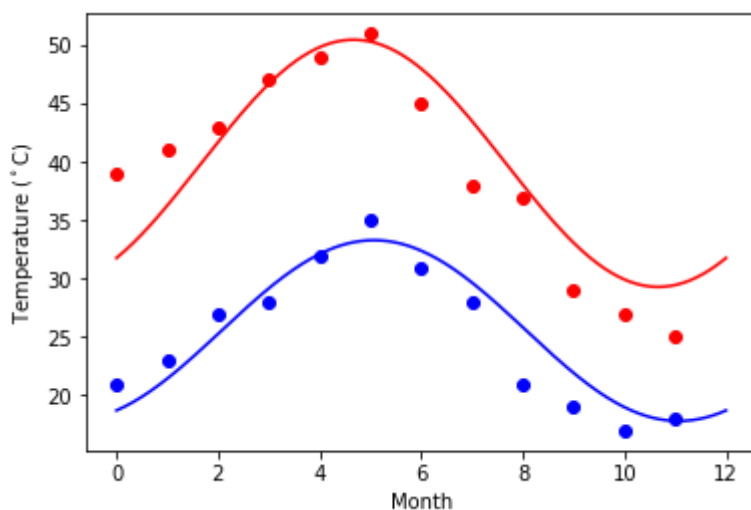
# Given Input Data array for Max and Min
temp_max = np.array([39, 41, 43, 47, 49, 51, 45, 38, 37, 29, 27, 25])
temp_min = np.array([21, 23, 27, 28, 32, 35, 31, 28, 21, 19, 17, 18])

def yearly_temps(times, avg, ampl, time_offset):
    return (avg + ampl * np.cos((times + time_offset) * 2 * np.pi / times.max()))

res_max, cov_max = optimize.curve_fit(yearly_temps, months, temp_max, [20, 10, 0])
res_min, cov_min = optimize.curve_fit(yearly_temps, months, temp_min, [-40, 20, 0])
days = np.linspace(0, 12, num=365)

# Plotting graph to show the curve fitting...
plt.figure()
plt.plot(months, temp_max, 'ro')
plt.plot(days, yearly_temps(days, *res_max), 'r-')
plt.plot(months, temp_min, 'bo')
plt.plot(days, yearly_temps(days, *res_min), 'b-')
plt.xlabel('Month')
plt.ylabel('Temperature ( $^{\circ}$ C)')
plt.rcParams['figure.figsize'] = [6,4]
plt.show()

```



Matplotlib:  
 This assignment is for visualization using matplotlib:  
 data to use:

```
url= https://raw.githubusercontent.com/Geoyi/Cleaning-Titanic-Data/master/titanic_original.csv
```

```
titanic = pd.read_csv(url)
```

Charts to plot:

1. Create a pie chart presenting the male/female proportion
2. Create a scatterplot with the Fare paid and the Age, differ the plot color by gender

In [5]:

```
# Solution for 1 in Matplotlib section - Pie Chart
```

```
import pandas as pd
```

```
import matplotlib.pyplot as plt
```

```
url = "https://raw.githubusercontent.com/Geoyi/Cleaning-Titanic-Data/master/titanic_original.csv"
```

```
titanic = pd.read_csv(url) # Reading CSV file from the given URL
```

```
genderCounts = titanic.groupby('sex').size()
```

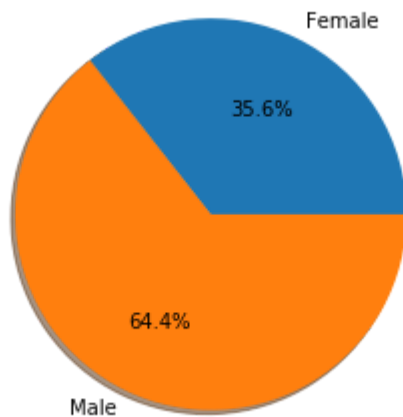
```
gender=['Female','Male']
```

```
pie = plt.pie(genderCounts, labels=gender, shadow=True, autopct='%1.1f%%')
```

```
plt.axis('equal');
```

```
plt.rcParams['figure.figsize'] = [5,5]
```

```
plt.show()
```



In [7]:

```
# Solution for 2 in Matplotlib section - Scatter Plot
```

```
plt.scatter(titanic.age[titanic.sex=='male'], titanic.fare[titanic.sex=='male'], alpha=0.5,  
plt.scatter(titanic.age[titanic.sex=='female'], titanic.fare[titanic.sex=='female'], alpha=  
plt.rcParams['figure.figsize'] = [15,6]  
plt.title("Scatterplot with the Fare paid and the Age")  
plt.ylabel('Fare Paid')  
plt.xlabel('Age')  
plt.legend()  
plt.grid(True)  
plt.show()
```

