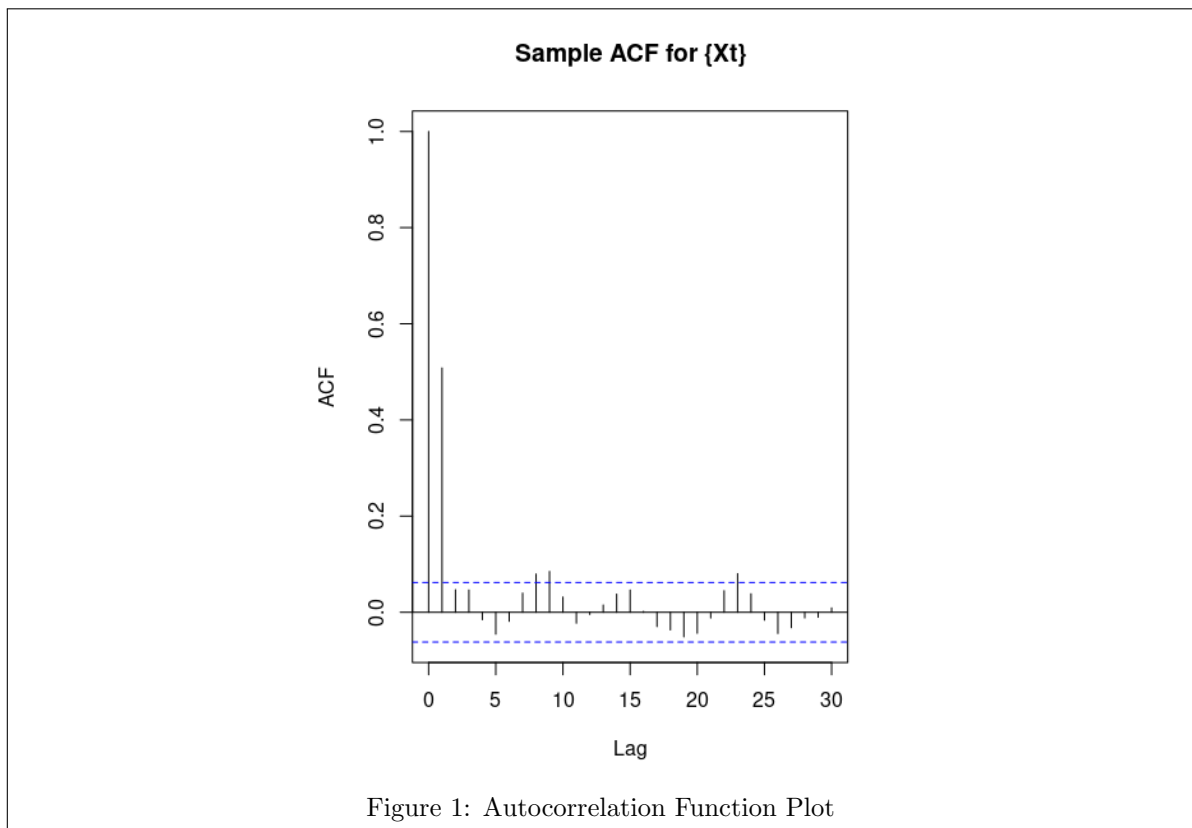# Statistics Software Lab Report - 12 (Outputs file)

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IIT Kharagpur
Statistics Software Lab

Solution for Problem-1

Figure 1: Autocorrelation Function Plot

Solution for Problem-2

```
# Solution  for Problem-2:
Sample ACVF:
1.0000000000   1.0000000000  -0.4624157370   0.2103722494  -0.0695036669
    -0.0132493015   0.0151967521  -0.0110772091
-0.0009075037   0.0065359217  -0.0091717363  -0.0126455763   0.0646329414
    -0.0543625512   0.0569051281  -0.0187111728
0.0090514632   0.0090087991  -0.0665529532   0.0893768122  -0.0844070356
    0.0362326535   0.0458332671  -0.0829608639
0.0691079469  -0.0822224504   0.0336663548  -0.0454394984   0.0267833024
    0.0147254215  -0.0262247490   0.0340695267

Best linear predictor of X[n+1]:
46.54648

Mean square error:
144
```

Solution for Problem-3

```
# Solution  for Problem-3:
Sample ACVF:
1.0000000000  1.0000000000  0.1315187850 -0.3210639866 -0.0333706932
    -0.0303522961  0.0296156544  0.0126118549
0.0086875694 -0.0227306957 -0.0122300448  0.0040918696 -0.0346119478
    0.0242140913  0.0380955163  0.0079298862
-0.0024492166 -0.0016180245  0.0091233161 -0.0075485984  0.0002342096
    -0.0070358994 -0.0460477445 -0.0214081527
0.0458456297  0.0202183675 -0.0147902971  0.0188304938  0.0101103668
    -0.0211727609  0.0044625538  0.0383074727

Variance of the sample mean (X1 + X2 + X3 + X4)/4:
0.2525
```

Solution for Problem-4

```
# Solution for Problem-4:
Sample partial autocorrelation function (PACF):

-0.9955759067   0.4141508673   0.0572001429   0.0178475628   0.0100569531
    0.0183199223   -0.0018552865   -0.0119747514   0.0325321399
    -0.0152414482   -0.0006262035   0.0107884417
 0.0299269945   0.0230069638   0.0195159995   0.0518875185   -0.0152766051
      0.0626349059   0.0255463560   -0.0150289741   0.0252100815
      0.0300366176   0.0077794438   0.0246870575   0.0254330294
      0.0061267196   -0.0046498138   -0.0366933736   -0.0326764474
      -0.0367033702
```

Solution for Problem-5

```
# Solution for Exercise-5:
Autocorrelations of series    Xt   , by lag

     0        1        2        3        4        5        6        7        8        9       10
              11       12       13       14       15
 1.000  0.827  0.470  0.072 -0.242 -0.412 -0.393 -0.203  0.088  0.396  0.607
       0.646  0.501  0.233 -0.052 -0.271
    16       17       18       19       20       21       22       23       24
-0.374 -0.347 -0.210  0.002  0.213  0.363  0.395  0.292  0.089


Partial autocorrelations of series    Xt   , by lag

     1        2        3        4        5        6        7        8        9       10       11
              12       13       14       15       16
```

```
13    0.827 -0.678 -0.119   0.022 -0.044   0.207   0.192   0.162   0.259   0.013 -0.015
         -0.027 -0.050   0.093 -0.048 -0.087
14       17      18      19      20      21      22      23      24
15  -0.055 -0.111   0.043 -0.027   0.053 -0.019 -0.102 -0.061

16
17  ARIMA Model
18          Length Class   Mode
19  coef        3    -none- numeric
20  sigma2      1    -none- numeric
21  var.coef    9    -none- numeric
22  mask        3    -none- logical
23  loglik      1    -none- numeric
24  aic         1    -none- numeric
25  arma        7    -none- numeric
26  residuals 285     ts    numeric
27  call        3    -none- call
28  series      1    -none- character
29  code        1    -none- numeric
30  n.cond      1    -none- numeric
31  nobs        1    -none- numeric
32  model      10    -none- list

33
34  Prediction Intervals

35
36  Forecast for h = 1 : 32.55244
37  95% Prediction Interval for h = 1 : [ 0.5811419 , 64.52375 ]

38
39  Forecast for h = 2 : 28.1869
40  95% Prediction Interval for h = 2 : [ -26.4308 , 82.8046 ]

41
42  Forecast for h = 3 : 31.24615
43  95% Prediction Interval for h = 3 : [ -36.17163 , 98.66392 ]

44
45  Forecast for h = 4 : 38.46162
46  95% Prediction Interval for h = 4 : [ -33.28084 , 110.2041 ]
```
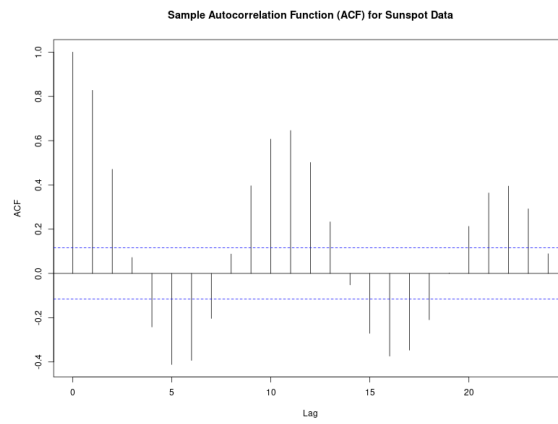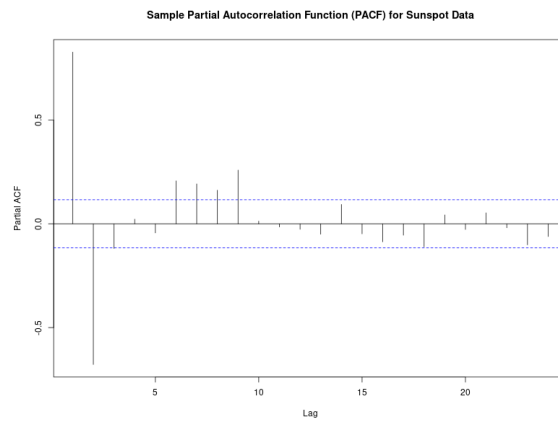
Plots for Problem-5

Figure 2: Autocorrelation Function Plot

Figure 3: Partial Autocorrelation Function Plot