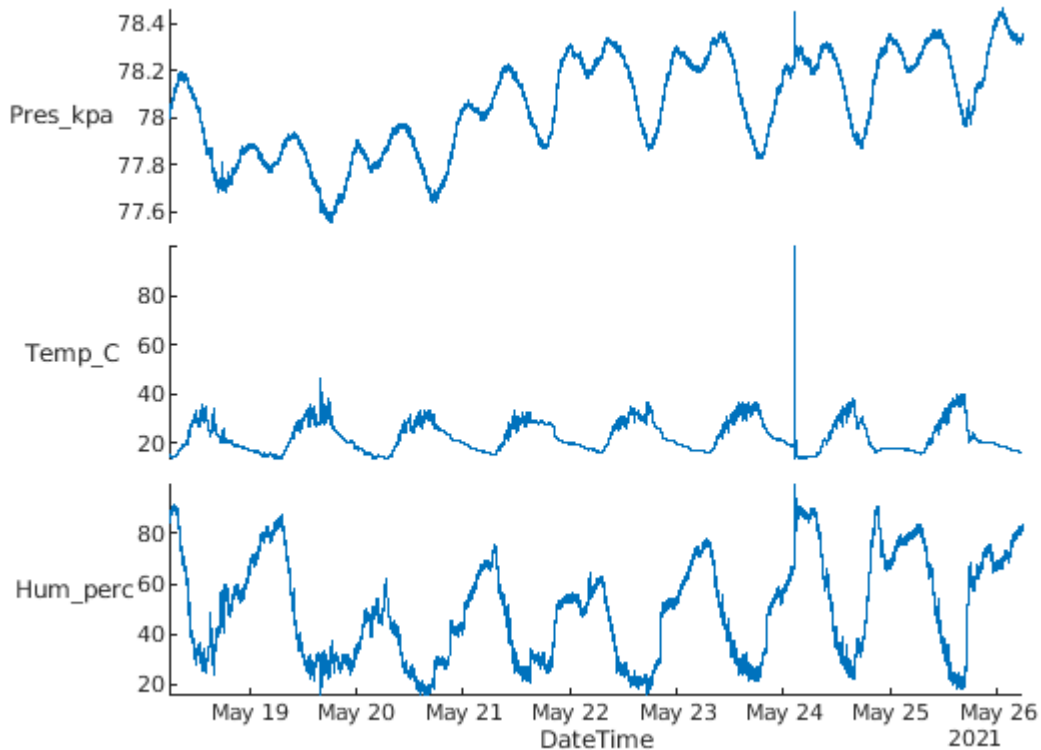# Estadística La Venganza

Importar datos

```
load("../../Digitalizacion de señales/S3/Utils4SP/Datasets/S5_Estadistica101_LaVenganza
```

Plots Exploratorios

```
figure
stackedplot(atmosfera,'XVariable','DateTime')
```



```
summary(atmosfera)
```

Variables:

    Fecha: 137522×1 cell array of character vectors

    Hora: 137522×1 cell array of character vectors

    Pres_kpa: 137522×1 double

        Values:

            Min   77.55
            Median   78.06
            Max   78.46

    Temp_C: 137522×1 double

```
Values:

    Min             13.38
    Median          21.01
    Max             100
    NumMissing      11
```

Hum_perc: 137522×1 double

```
    Values:

    Min             15.27
    Median          50.16
    Max             99.97
    NumMissing      61
```

DateTime: 137522×1 datetime

```
    Values:

    Min        20210518 06:00:03
    Median     20210522 05:59:48
    Max        20210526 05:59:55
```

```
%Exploración de números faltantes
%Todos las lecturas de atmósfera tal que existan NaNs en su campo "Humedad"
%y que sean todos los campos
atmosfera(ismissing(atmosfera.Hum_perc),:)
```

ans = 61×6 table

	Fecha	Hora	Pres_kpa	Temp_C	Hum_perc	DateTime
1	'210519'	'01:55:14'	77.8600	16.5900	NaN	20210519 0...
2	'210523'	'04:27:47'	78.2000	17.2300	NaN	20210523 0...
3	'210523'	'05:17:37'	78.2000	17.2000	NaN	20210523 0...
4	'210524'	'02:32:46'	78.3800	100	NaN	20210524 0...
5	'210524'	'02:32:56'	78.3800	100	NaN	20210524 0...
6	'210524'	'02:33:06'	78.3800	100	NaN	20210524 0...
7	'210524'	'02:33:11'	78.3800	100	NaN	20210524 0...
8	'210524'	'02:33:16'	78.3900	100	NaN	20210524 0...
9	'210524'	'02:33:21'	78.3800	100	NaN	20210524 0...
10	'210524'	'02:33:26'	78.3800	100	NaN	20210524 0...
11	'210524'	'02:33:31'	78.3700	100	NaN	20210524 0...
12	'210524'	'02:33:36'	78.3700	100	NaN	20210524 0...
13	'210524'	'02:33:41'	78.3600	100	NaN	20210524 0...
14	'210524'	'02:33:47'	78.3600	100	NaN	20210524 0...

⋮

```
%Exploración de números faltantes
%Todos las lecturas de atmósfera tal que existan NaNs en su campo "Temperatura"
%y que sean todos los campos

atmosfera(ismissing(atmosfera.Temp_C),:)
```

ans = 11×6 table

	Fecha	Hora	Pres_kpa	Temp_C	Hum_perc	DateTime
1	'210518'	'17:59:58'	77.7100	NaN	49.6800	20210518 1...
2	'210520'	'09:27:14'	77.9500	NaN	38.9700	20210520 0...
3	'210520'	'09:37:27'	77.9500	NaN	39.4700	20210520 0...
4	'210520'	'21:22:43'	77.8400	NaN	44.8400	20210520 2...
5	'210521'	'20:50:27'	78.0400	NaN	48.0700	20210521 2...
6	'210522'	'20:57:34'	78.0700	NaN	51.3400	20210522 2...
7	'210522'	'20:57:44'	78.0800	NaN	51.2100	20210522 2...
8	'210522'	'20:58:39'	78.0700	NaN	51.2900	20210522 2...
9	'210523'	'10:19:08'	78.3200	NaN	53.7100	20210523 1...
10	'210523'	'21:44:54'	78.0100	NaN	52.8200	20210523 2...
11	'210525'	'18:14:48'	78	NaN	61.0600	20210525 1...

```
%Exploración de números faltantes
%Todos las lecturas de atmósfera tal que existan NaNs en su campo "Temperatura"
%y que sean DateTime y Humedad

atmosfera(ismissing(atmosfera.Temp_C),["DateTime" "Hum_perc"])
```
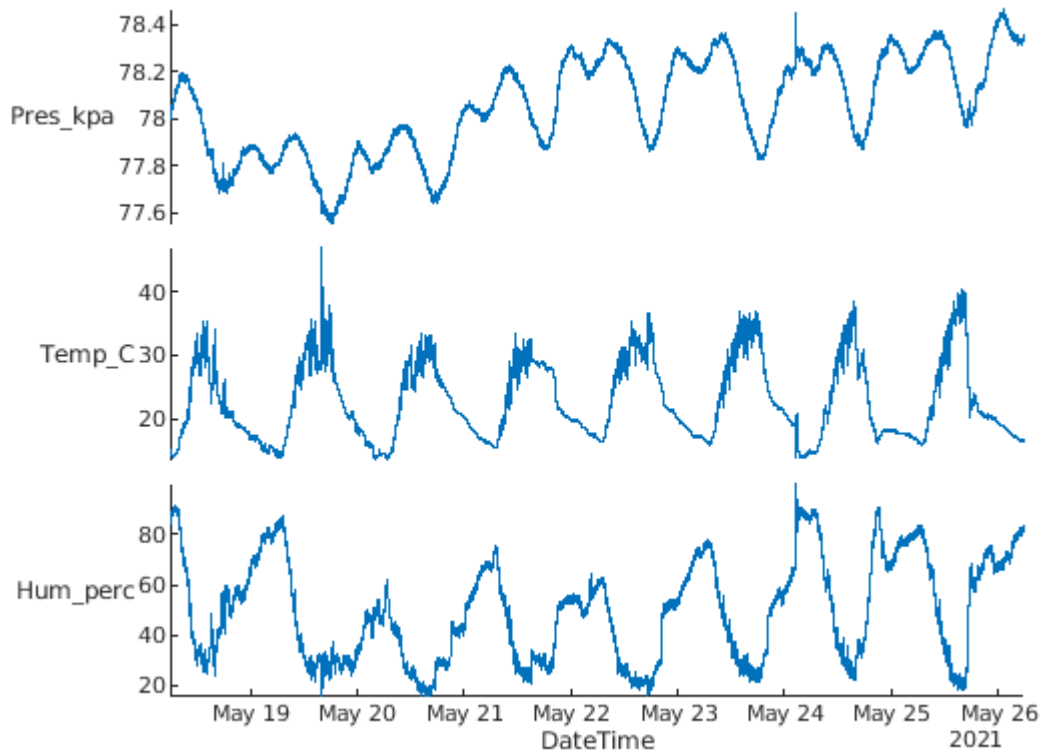
ans = 11×2 table

	DateTime	Hum_perc
1	20210518 1...	49.6800
2	20210520 0...	38.9700
3	20210520 0...	39.4700
4	20210520 2...	44.8400
5	20210521 2...	48.0700
6	20210522 2...	51.3400
7	20210522 2...	51.2100
8	20210522 2...	51.2900
9	20210523 1...	53.7100
10	20210523 2...	52.8200
11	20210525 1...	61.0600

```
atmosfera_clean=rmmissing(atmosfera);

figure
stackedplot(atmosfera_clean,'XVariable','DateTime')
```


Métricas de tendencia central

```
%Una gráfica con boxplot e histograma
figure
tiledlayout(1,2)
nexttile
boxplot(atmosfera_clean.Hum_perc)
```
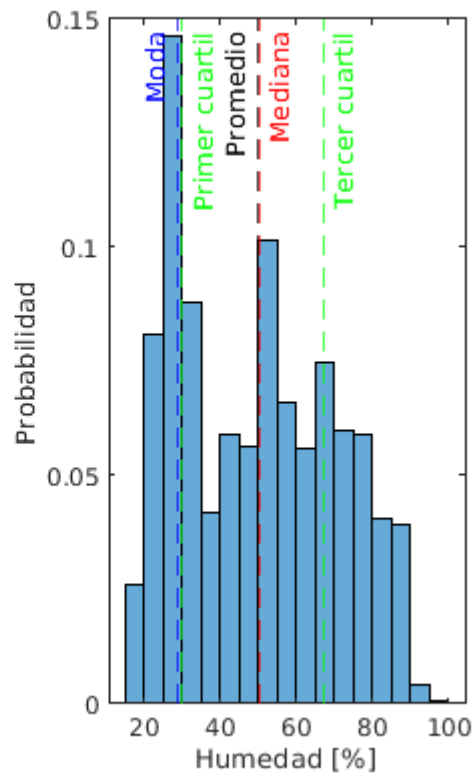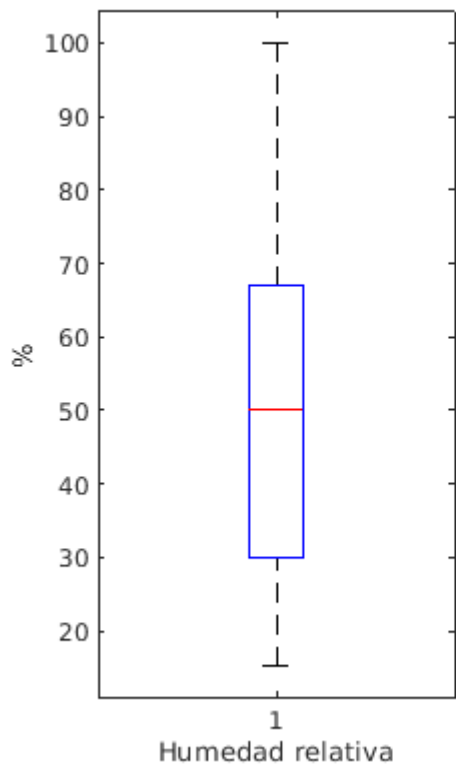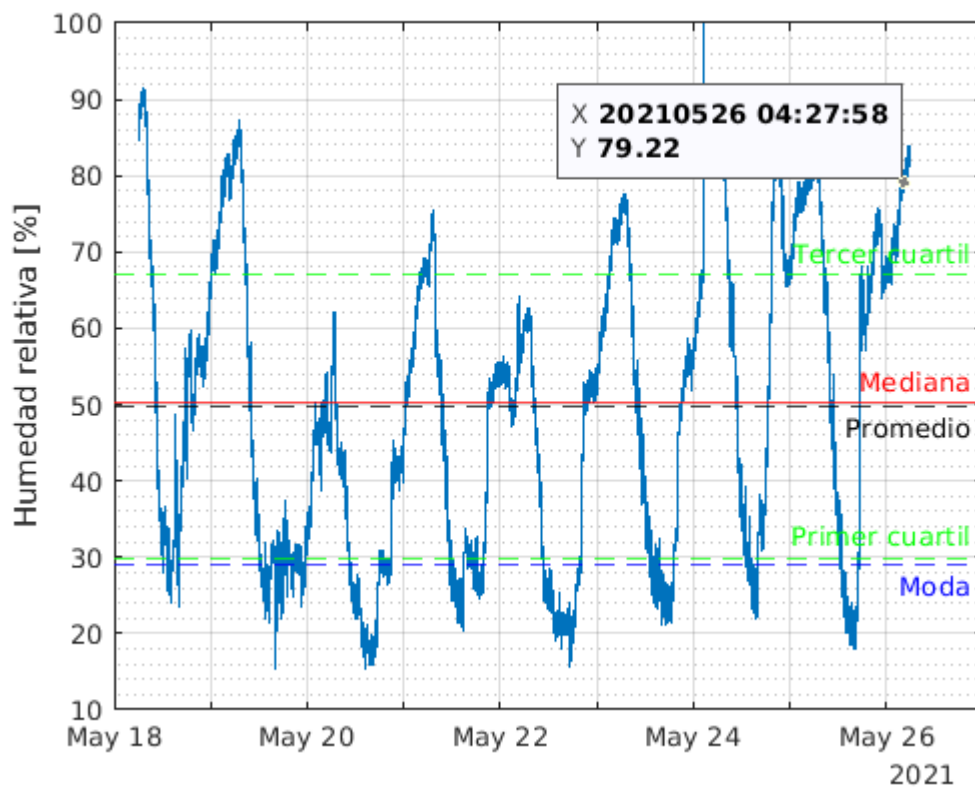
Warning: Unable to set 'Position', 'InnerPosition', 'OuterPosition', or 'ActivePositionProperty'
for objects in a TiledChartLayout

```
xlabel("Humedad relativa")
ylabel("%")

nexttile
histogram(atmosfera_clean.Hum_perc,'BinWidth',5,'Normalization',"probability")
xlabel("Humedad [%]")
ylabel("Probabilidad")

%Serie de tiempo
figure
plot(atmosfera_clean.DateTime,atmosfera_clean.Hum_perc)
```

```
ylabel("Humedad relativa [%]")
grid on
grid minor
```
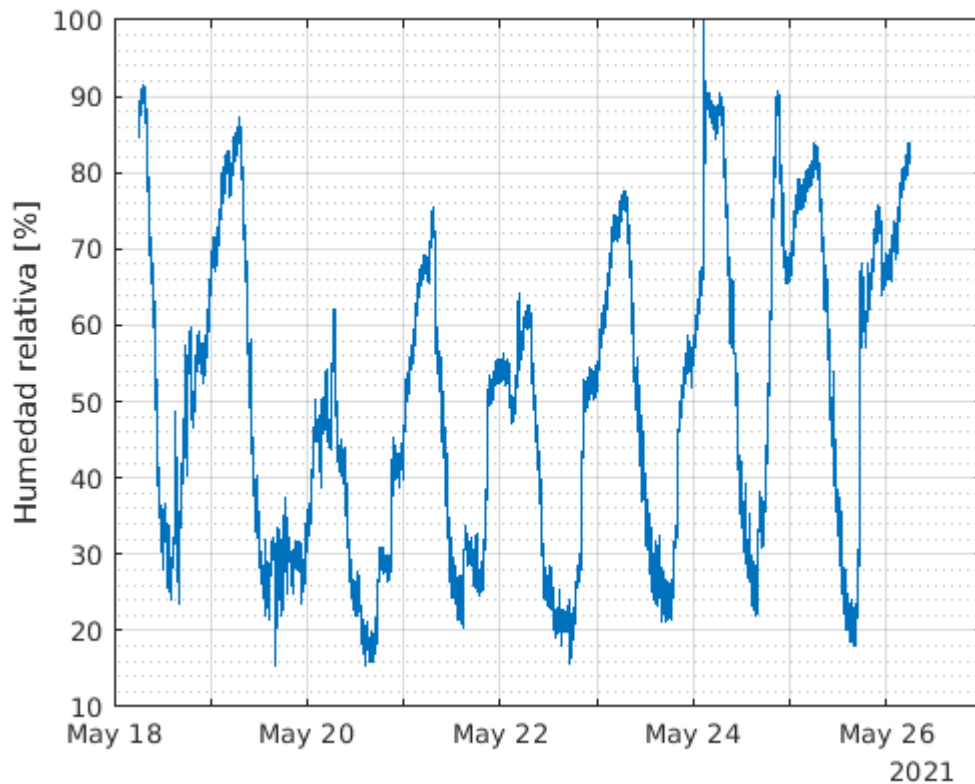


```
%mediana y promedio

%promedio
hum_mean=mean(atmosfera_clean.Hum_perc)
```

```
hum_mean = 49.6841
```

```
%mediana
hum_median=median(atmosfera_clean.Hum_perc)
```

```
hum_median = 50.1550
```

```
%moda
hum_mode=mode(atmosfera_clean.Hum_perc)
```

```
hum_mode = 28.9200
```

```
%Cuantiles
%Primer cuartil
hum_1Q=quantile(atmosfera_clean.Hum_perc,0.25)
```

```
hum_1Q = 29.8800
```

```
%tercer cuartil
hum_2Q=quantile(atmosfera_clean.Hum_perc,0.75)
```

hum_2Q = 66.9600

```
%Una gráfica con boxplot e histograma con promedio y mediana
figure
tiledlayout(1,2)
nexttile
boxplot(atmosfera_clean.Hum_perc)
```

```
xlabel("Humedad relativa")
ylabel("%")

nexttile
histogram(atmosfera_clean.Hum_perc,'BinWidth',5,'Normalization',"probability")
xlabel("Humedad [%]")
ylabel("Probabilidad")
hold on
xline(hum_median,'--r','Mediana')
xline(hum_mean,'--k','Promedio',"LabelHorizontalAlignment","left")
xline(hum_mode,'--b','Moda',"LabelHorizontalAlignment","left")
xline(hum_1Q,'--g','Primer cuartil')
xline(hum_2Q,'--g','Tercer cuartil')
hold off
```

```
%Serie de tiempo
figure
plot(atmosfera_clean.DateTime,atmosfera_clean.Hum_perc)
hold on
yline(hum_median,'r','Mediana')
yline(hum_mean,'--k','Promedio',"LabelVerticalAlignment","bottom")
yline(hum_mode,'--b','Moda',"LabelVerticalAlignment","bottom")
yline(hum_1Q,'--g','Primer cuartil')
yline(hum_2Q,'--g','Tercer cuartil')
hold off
ylabel("Humedad relativa [%]")
grid on
grid minor
```

Dispersión

```
buho_left=buho(:,1);
%plot(buho_left)

figure
tiledlayout(1,2)
nexttile
boxplot(buho_left)
```

```
Warning: Unable to set 'Position', 'InnerPosition', 'OuterPosition', or 'ActivePositionProperty'
for objects in a TiledChartLayout
```
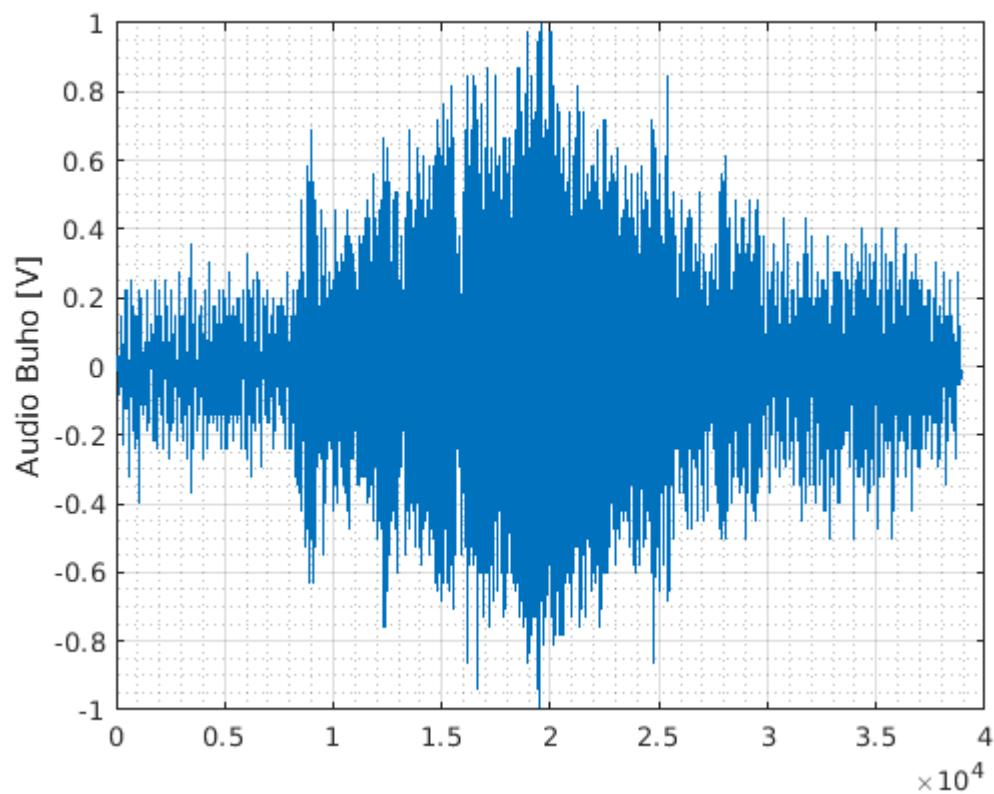
```
xlabel("Audio Buho")
ylabel("V")

nexttile
histogram(buho_left,20,'Normalization',"probability")
xlabel("Audio Buho [V]")
ylabel("Probabilidad")

%Serie de tiempo
figure
plot(buho_left)
ylabel("Audio Buho [V]")
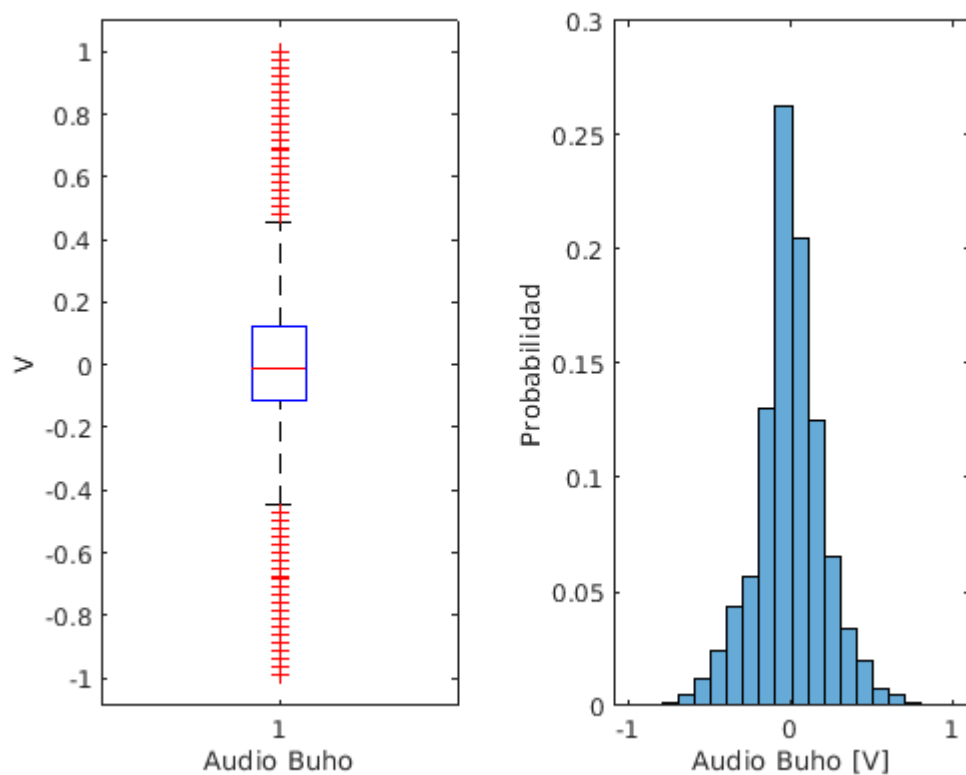```

```
grid on
grid minor
```



```
%Promedio
buho_mean= mean(buho_left);

%Var
buho_var=var(buho_left);

%std
buho_std=std(buho_left);


figure
tiledlayout(1,2)
nexttile
boxplot(buho_left)
```
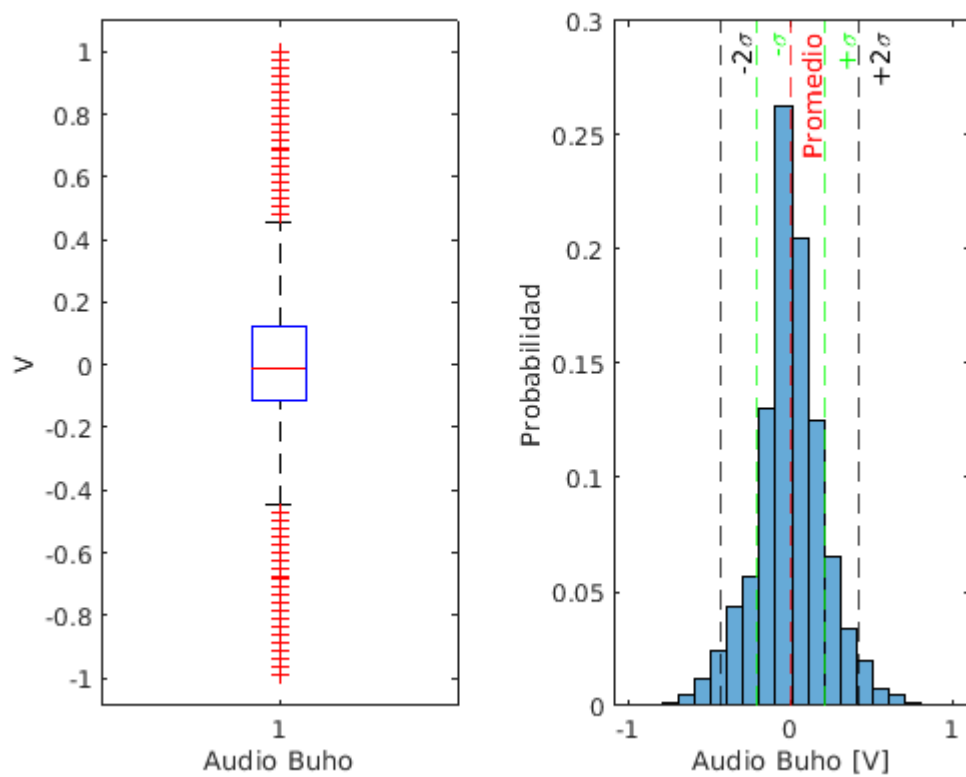
```
xlabel("Audio Buho")
ylabel("V")

nexttile
histogram(buho_left,20,'Normalization',"probability")
xlabel("Audio Buho [V]")
ylabel("Probabilidad")
hold on
xline(buho_mean,'--r','Promedio')
xline(buho_mean+buho_std,'--g','+\sigma')
xline(buho_mean-buho_std,'--g','-\sigma')
xline(buho_mean+2*buho_std,'--k','+2\sigma')
xline(buho_mean-2*buho_std,'--k','-2\sigma')
hold off
```

```
%Serie de tiempo
figure
plot(buho_left)
ylabel("Audio Buho [V]")
hold on
yline(buho_mean,'--r','Promedio')
yline(buho_mean+buho_std,'--g','+\sigma')
yline(buho_mean-buho_std,'--g','-\sigma')
yline(buho_mean+2*buho_std,'--k','+2\sigma')
yline(buho_mean-2*buho_std,'--k','-2\sigma')
hold off
grid on
grid minor
```
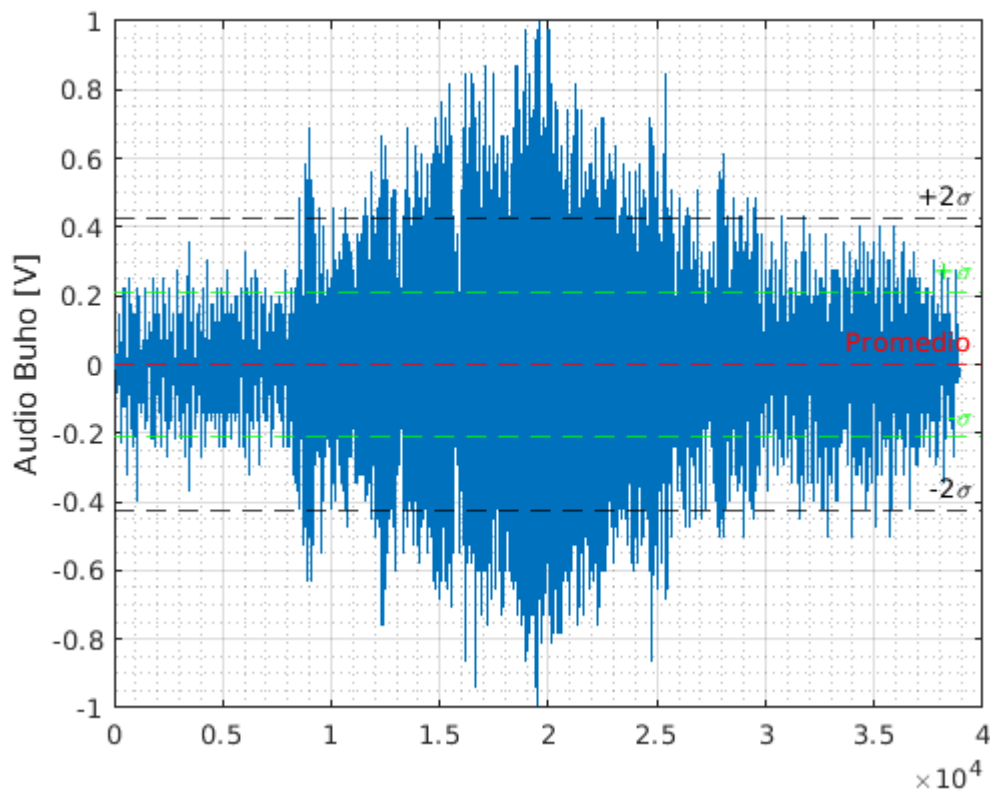
Ajustes

```
plot(atmosfera_clean.Temp_C,atmosfera_clean.Hum_perc,'.')
xlabel("Temperatura [°C]")
ylabel("Humedad [%]")
grid on

[fit_relacion,gof]=fit(atmosfera_clean.Temp_C,atmosfera_clean.Hum_perc,'poly1')
```

```
fit_relacion =
     Linear model Poly1:
     fit_relacion(x) = p1*x + p2
     Coefficients (with 95% confidence bounds):
       p1 =       -2.772  (-2.781, -2.763)
       p2 =        113.2  (112.9, 113.4)
gof = struct with fields:
           sse: 1.5967e+07
       rsquare: 0.7212
           dfe: 137448
     adjrsquare: 0.7212
          rmse: 10.7783
```

```
[fit_relacion2,gof]=fit(atmosfera_clean.Temp_C,atmosfera_clean.Hum_perc,'poly2')
```

```
fit_relacion2 =
     Linear model Poly2:
     fit_relacion2(x) = p1*x^2 + p2*x + p3
```

```
      Coefficients (with 95% confidence bounds):
        p1 =        0.088  (0.08654, 0.08946)
        p2 =       -7.097  (-7.169, -7.024)
        p3 =        162.6  (161.8, 163.5)
gof = struct with fields:
          sse: 1.4498e+07
      rsquare: 0.7468
          dfe: 137447
    adjrsquare: 0.7468
         rmse: 10.2703
```
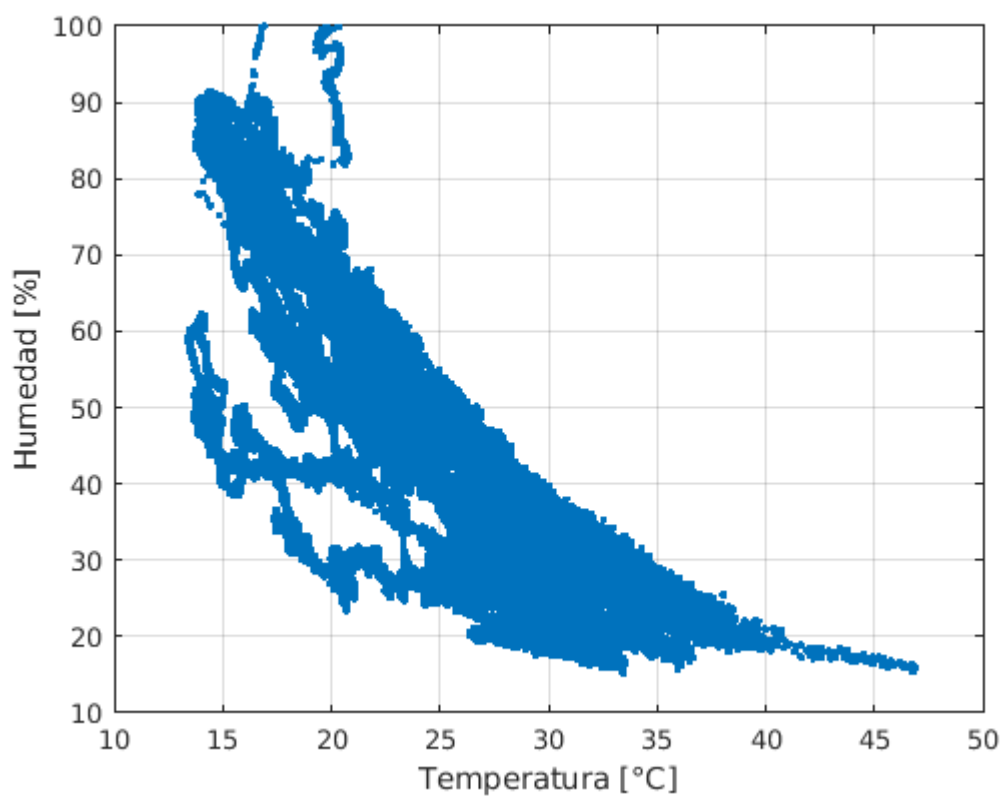
```matlab
figure
plot(atmosfera_clean.Temp_C,atmosfera_clean.Hum_perc,'.')
hold on
plot(fit_relacion,'r')
plot(fit_relacion2,'b')
```



```matlab
hold off
xlabel("Temperatura [°C]")
ylabel("Humedad [%]")
legend("Data","Ajuste de línea","Ajuste polinomio grado 2")
grid on
```