Rigid and Lasso Regression

In [1]:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import Ridge, RidgeCV, Lasso
from sklearn.preprocessing import StandardScaler
```

In [2]:

```
#data
data=pd.read_csv(r"C:\Users\mural\Downloads\Advertising.csv")
data
```

Out[2]:

	TV	Radio	Newspaper	Sales
0	230.1	37.8	69.2	22.1
1	44.5	39.3	45.1	10.4
2	17.2	45.9	69.3	12.0
3	151.5	41.3	58.5	16.5
4	180.8	10.8	58.4	17.9
...	...	...	...	...
195	38.2	3.7	13.8	7.6
196	94.2	4.9	8.1	14.0
197	177.0	9.3	6.4	14.8
198	283.6	42.0	66.2	25.5
199	232.1	8.6	8.7	18.4

200 rows × 4 columns

In [3]:

```
data.head()
```

Out[3]:

	TV	Radio	Newspaper	Sales
0	230.1	37.8	69.2	22.1
1	44.5	39.3	45.1	10.4
2	17.2	45.9	69.3	12.0
3	151.5	41.3	58.5	16.5
4	180.8	10.8	58.4	17.9

In [4]:

```
data.tail()
```

Out[4]:

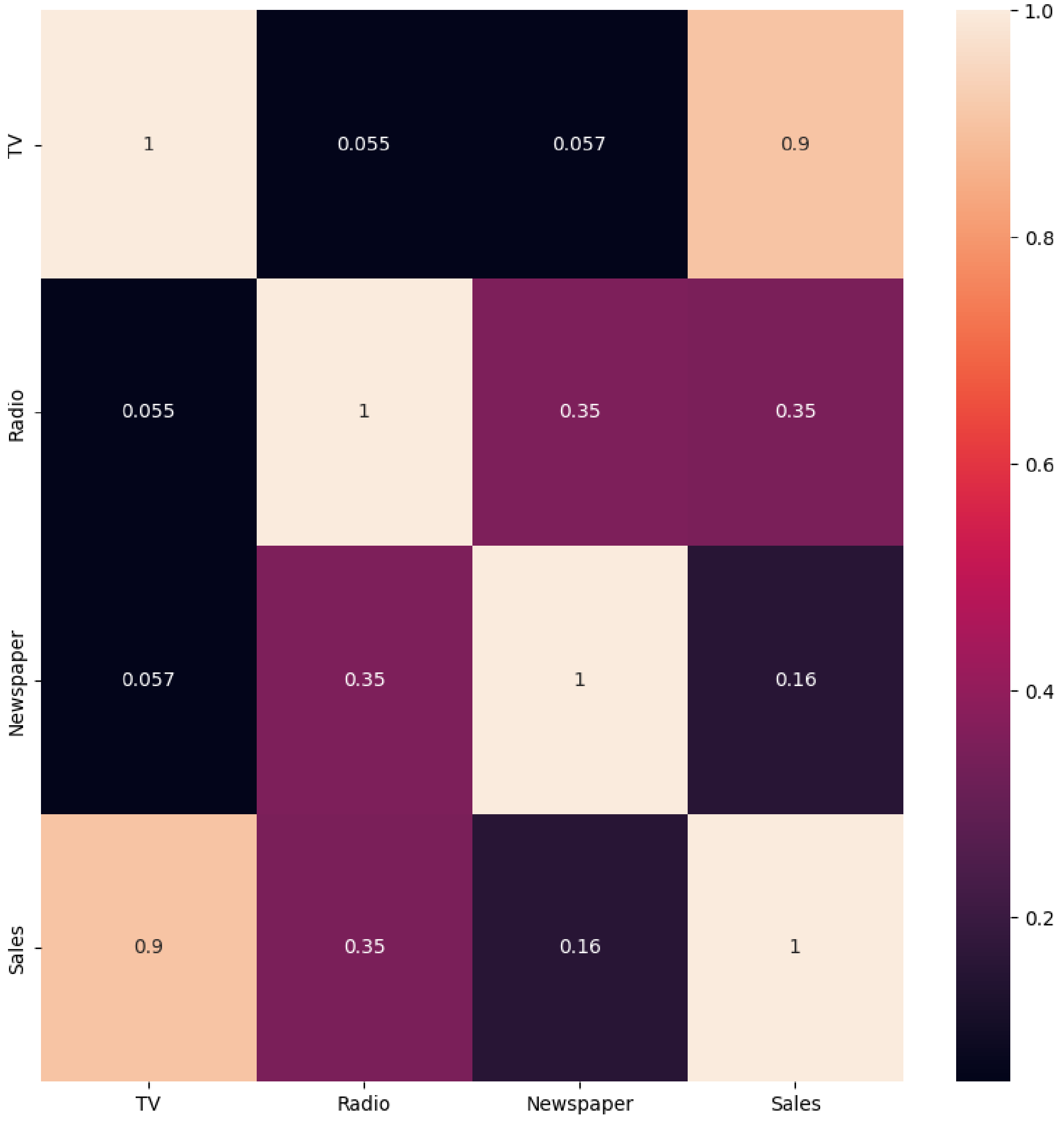
	TV	Radio	Newspaper	Sales
195	38.2	3.7	13.8	7.6
196	94.2	4.9	8.1	14.0
197	177.0	9.3	6.4	14.8
198	283.6	42.0	66.2	25.5
199	232.1	8.6	8.7	18.4

In [5]:

```
plt.figure(figsize = (10, 10))

sns.heatmap(data.corr(), annot = True)
```

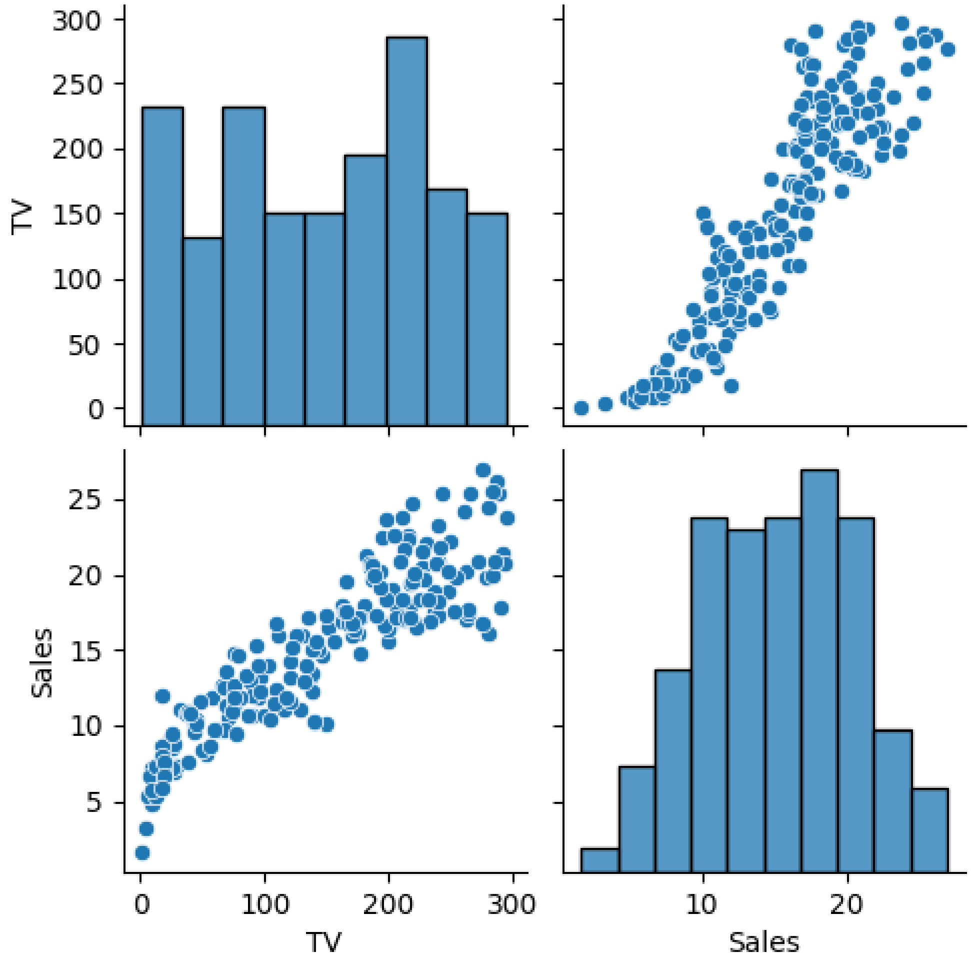
Out[5]:

```
<Axes: >
```



In [6]:

```
data.drop(columns = ["Radio", "Newspaper"], inplace = True)

#pairplot

sns.pairplot(data)

data.Sales = np.log(data.Sales)
```



In [7]:

```
features = data.columns[0:2]

target = data.columns[-1]

#X and y values

X = data[features].values

y = data[target].values

#splot

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=17

print("The dimension of X_train is {}".format(X_train.shape))

print("The dimension of X_test is {}".format(X_test.shape))

#Scale features

scaler = StandardScaler()

X_train = scaler.fit_transform(X_train)

X_test = scaler.transform(X_test)
```

```
The dimension of X_train is (140, 2)
The dimension of X_test is (60, 2)
```

In [8]:

```
#Model

lr = LinearRegression()

#Fit model

lr.fit(X_train, y_train)

#predict

#prediction = lr.predict(X_test)

#actual

actual = y_test

train_score_lr = lr.score(X_train, y_train)

test_score_lr = lr.score(X_test, y_test)

print("\nLinear Regression Model:\n")

print("The train score for lr model is {}".format(train_score_lr))

print("The test score for lr model is {}".format(test_score_lr))
```

```
Linear Regression Model:

The train score for lr model is 1.0
The test score for lr model is 1.0
```

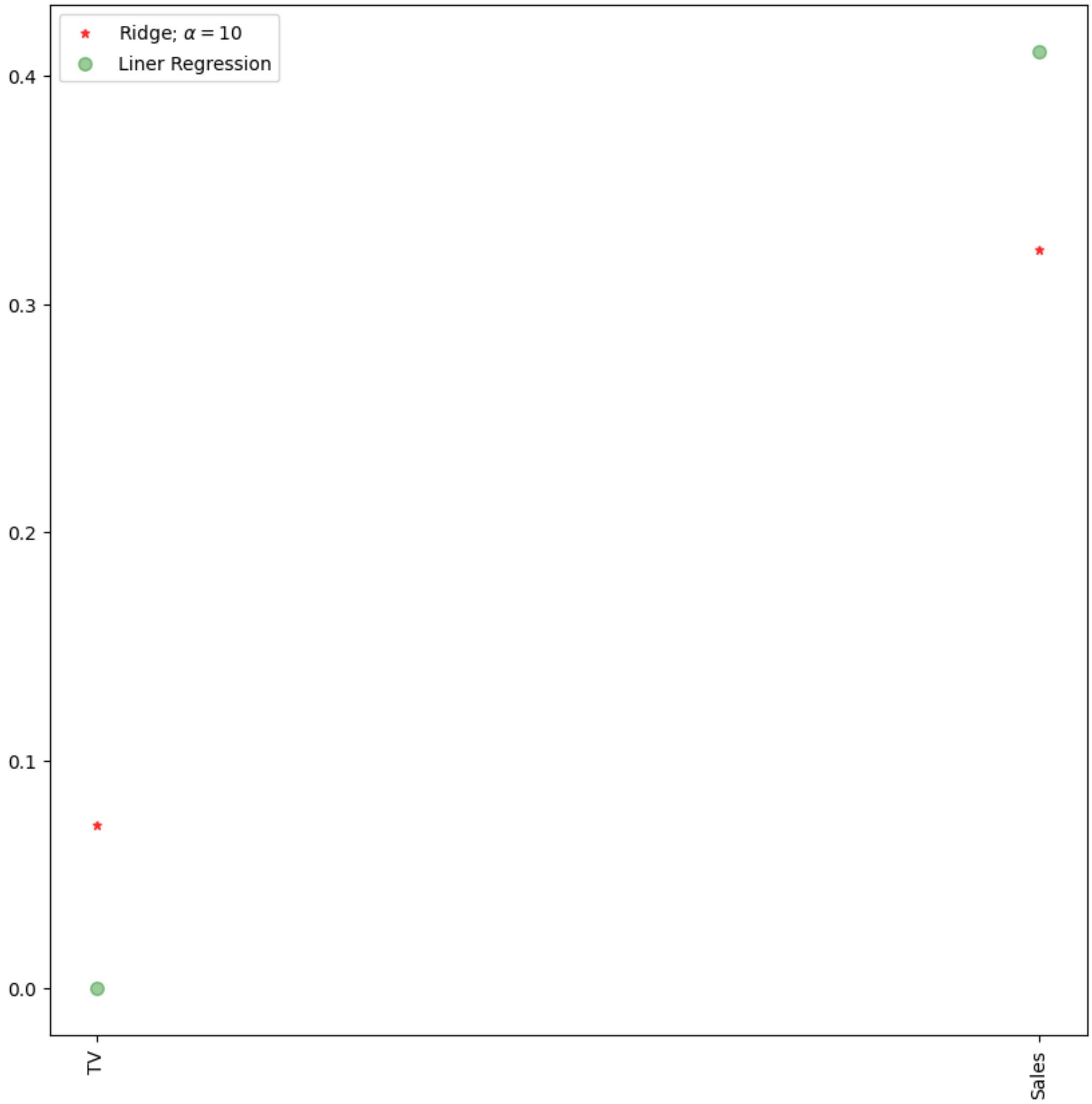
In [9]:

```
#Ridge Regression Model

ridgeReg = Ridge(alpha=10)

ridgeReg.fit(X_train,y_train)

#train and test scorefor ridge regression

train_score_ridge = ridgeReg.score(X_train, y_train)

test_score_ridge = ridgeReg.score(X_test, y_test)

print("\nRidge Model:\n")

print("The train score for ridge model is {}".format(train_score_ridge))

print("The test score for ridge model is {}".format(test_score_ridge))
```

```

Ridge Model:

The train score for ridge model is 0.990287139194161
The test score for ridge model is 0.9844266285141221
```

In [30]:

```
plt.figure(figsize = (10, 10))

plt.plot(features,ridgeReg.coef_,alpha=0.7,linestyle='none',marker='*',markersize=5,colo
plt.plot(features,lr.coef_,alpha=0.4,linestyle='none',marker='o',markersize=7,color='gre

plt.xticks(rotation = 90)

plt.legend()

plt.show()
```



In [12]:

```
#Lasso regression model

print("\nLasso Model: \n")

lasso = Lasso(alpha = 10)

lasso.fit(X_train,y_train)

train_score_ls =lasso.score(X_train,y_train)

test_score_ls =lasso.score(X_test,y_test)

print("The train score for ls model is {}".format(train_score_ls))

print("The test score for ls model is {}".format(test_score_ls))
```

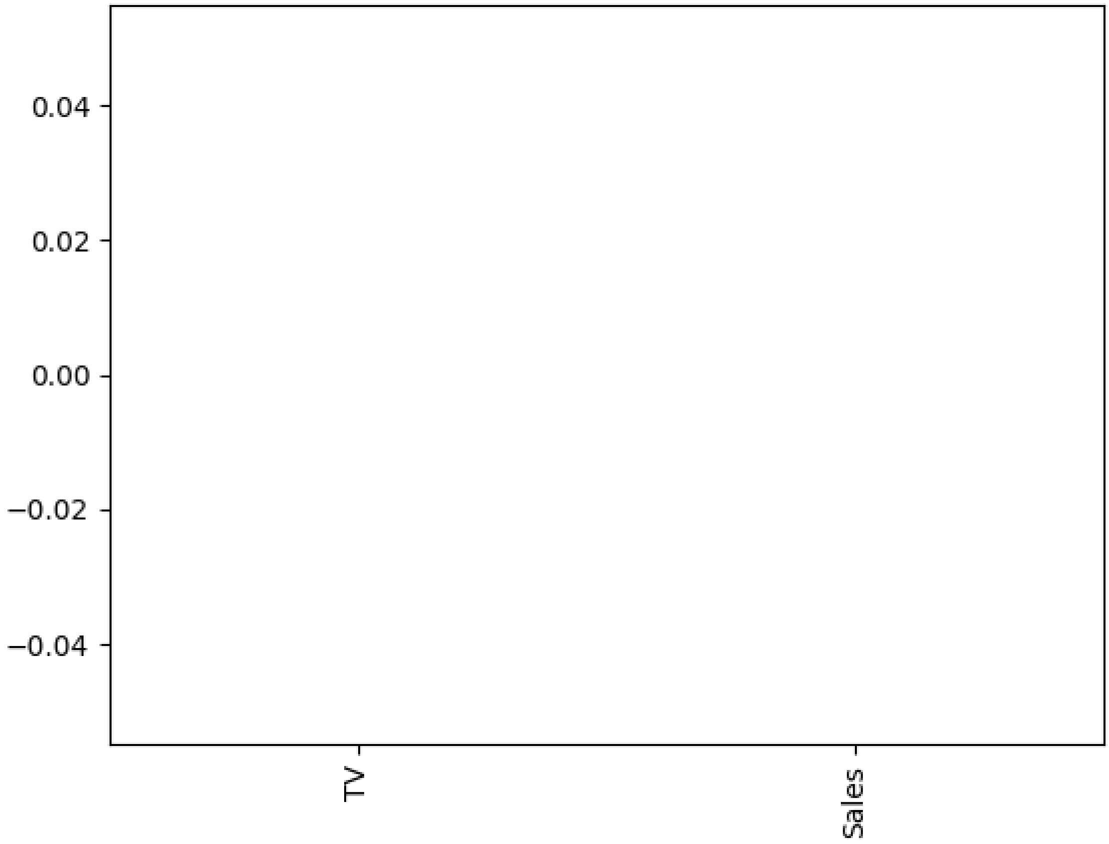
```
Lasso Model:

The train score for ls model is 0.0
The test score for ls model is -0.0042092253233847465
```

In [13]:

```
pd.Series(lasso.coef_, features).sort_values(ascending = True).plot(kind = "bar")
```

Out[13]:

```
<Axes: >
```



In [14]:

```
#Using the linear CV model

from sklearn.linear_model import LassoCV

#Lasso Cross validation

lasso_cv = LassoCV(alphas = [0.0001, 0.001,0.01, 0.1, 1, 10], random_state=0).fit(X_trai

#score

print(lasso_cv.score(X_train, y_train))

print(lasso_cv.score(X_test, y_test))
```

```
0.9999999343798134
0.9999999152638072
```

In [ ]: