In [1]:
```
from sklearn.datasets import make_regression
import pandas as pd
import numpy as np

import plotly.express as px
import plotly.graph_objects as go

from sklearn.metrics import mean_absolute_error, mean_squared_error, r2_score
```

In [2]:
```
X,y = make_regression(n_samples=100, n_features=2, n_informative=2, n_targets=1, no
```

In [7]:
```
df = pd.DataFrame({'feature1':X[:,0],'feature2':X[:,1],'target':y})
```

In [8]:
```
df.head()
```

Out[8]:

	feature1	feature2	target
0	1.105493	0.506375	100.023852
1	-1.025922	-0.179676	-58.150878
2	-2.117097	-2.113737	-97.902702
3	0.402840	0.722273	96.051774
4	0.839703	1.023998	-13.236176

In [10]:
```
df.shape
```

Out[10]:
```
(100, 3)
```

In [12]:
```
fig = px.scatter_3d(df, x='feature1', y='feature2', z='target')

fig.show()
```

In [14]:
```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test = train_test_split(X,y,test_size=0.2,random_state=3)
```

In [15]:
```
from sklearn.linear_model import LinearRegression
```

In [16]:
```
lr = LinearRegression()
```

In [17]:
```
lr.fit(X_train, y_train)
```

Out[17]:
```
▾ LinearRegression
LinearRegression()
```

In [18]:
```
y_pred = lr.predict(X_test)
```

In [19]:
```
print("MAE", mean_absolute_error(y_test,y_pred))
print("MSE", mean_squared_error(y_test,y_pred))
print("R2 score",r2_score(y_test,y_pred))
```

```
MAE 33.571310496719875
MSE 2164.6644530063713
R2 score 0.7105978378626778
```

In [25]:
```
x = np.linspace(-5, 5, 10)
y = np.linspace(-5, 5, 10)
xGrid, yGrid = np.meshgrid(y, x)

final = np.vstack((xGrid.ravel().reshape(1,100),yGrid.ravel().reshape(1,100))).T
```

```
z_final = lr.predict(final).reshape(10,10)

z = z_final
```

In [26]:
```
fig = px.scatter_3d(df, x='feature1', y='feature2', z='target')

fig.add_trace(go.Surface(x = x, y = y, z = z))

fig.show()
```

In [21]:
```
lr.coef_
```

Out[21]:
```
array([61.62953358, 10.93144872])
```

In [22]:
```
lr.intercept_
```

Out[22]:
```
6.810356149939503
```

In [ ]: