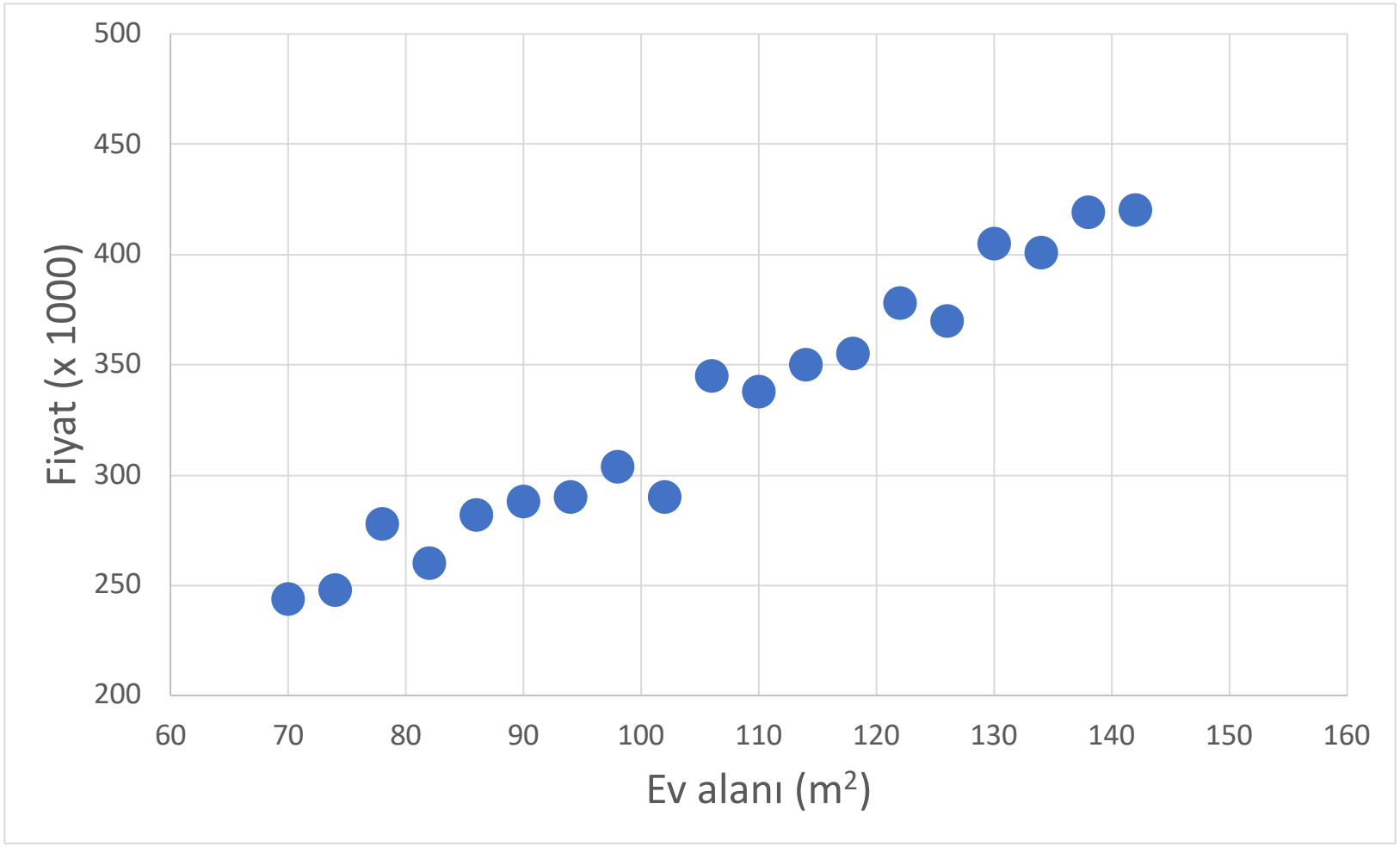
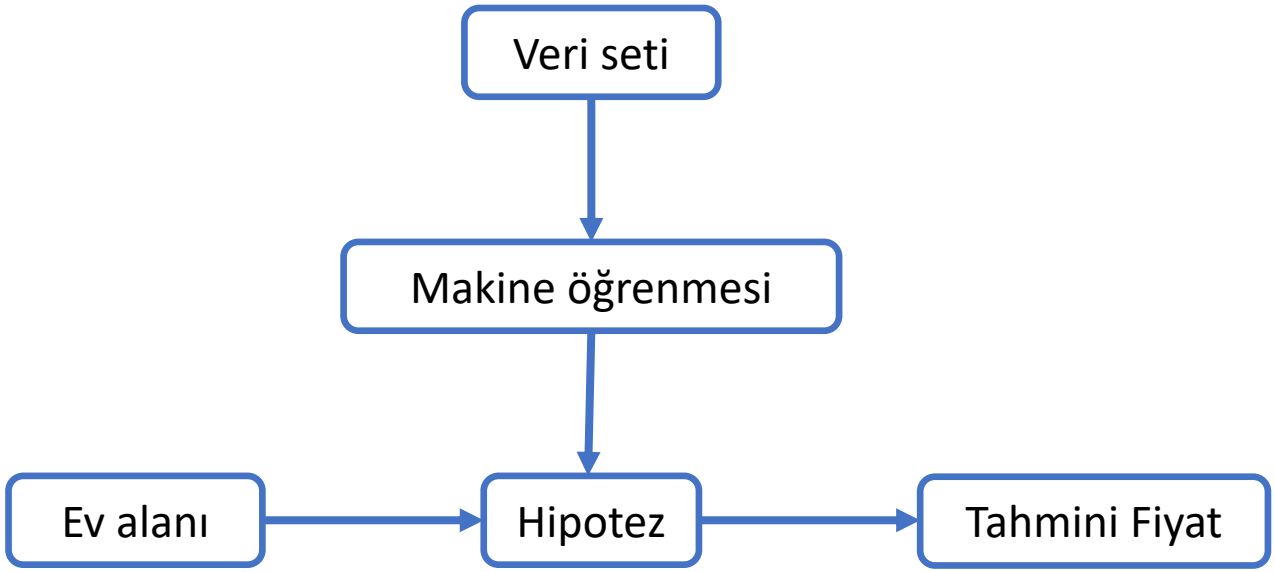
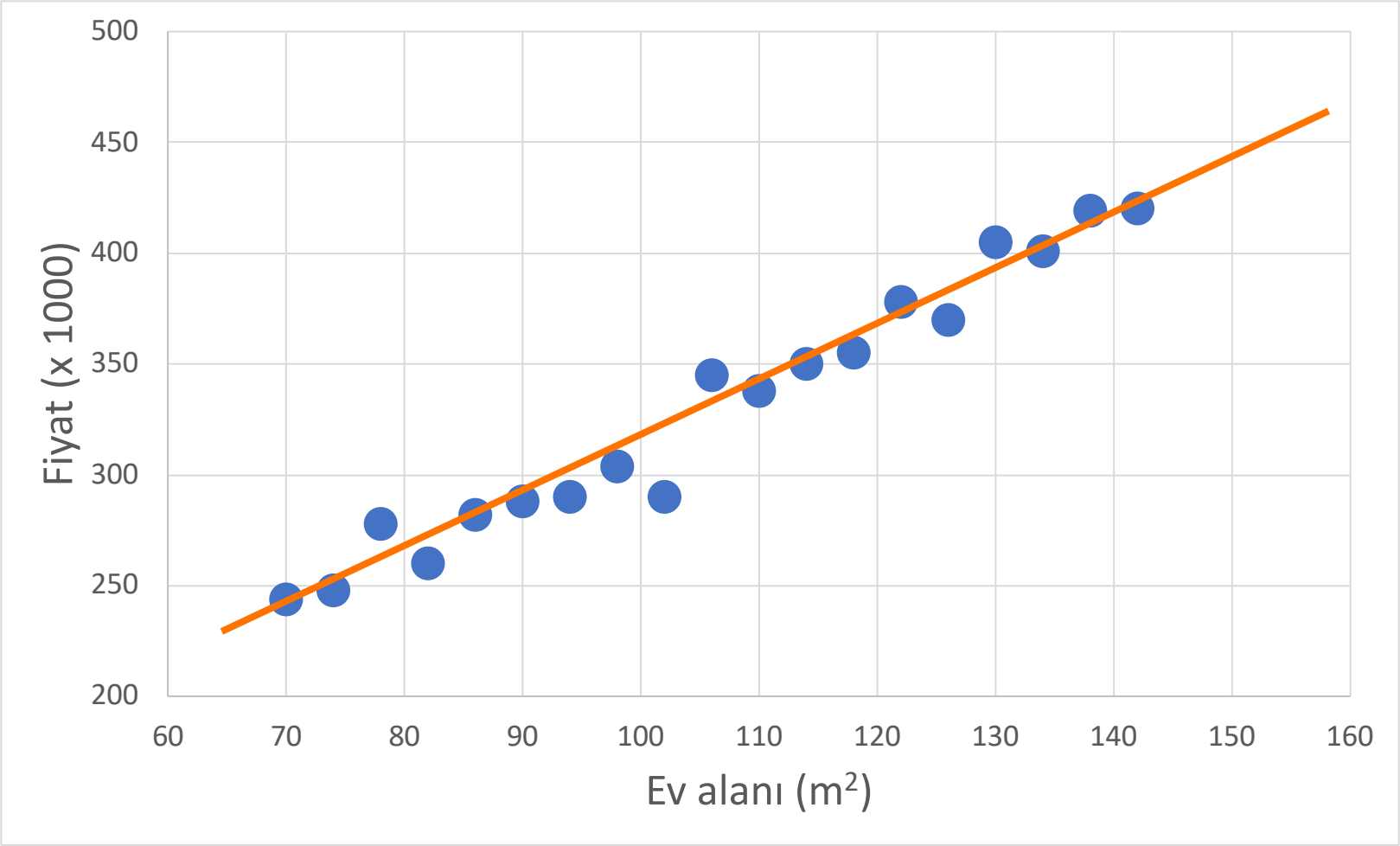
Doğrusal Regresyon (Linear Regression)



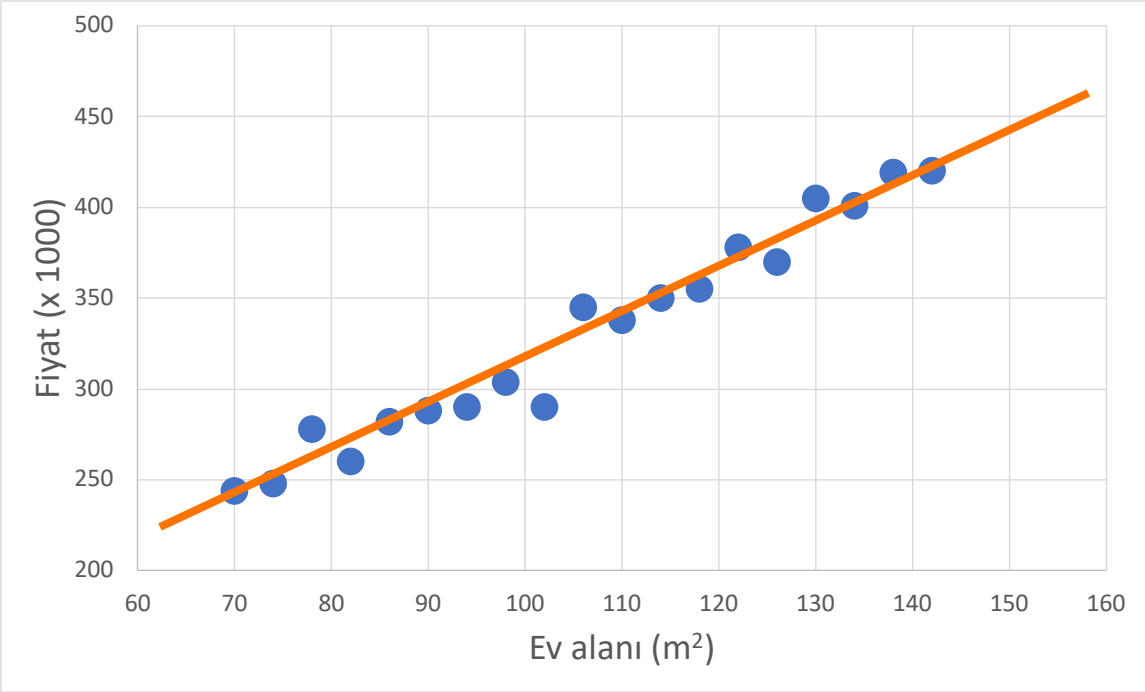
Doğrusal Regresyon (Linear Regression)



Doğrusal Regresyon (Linear Regression)



Doğrusal Regresyon (Linear Regression)



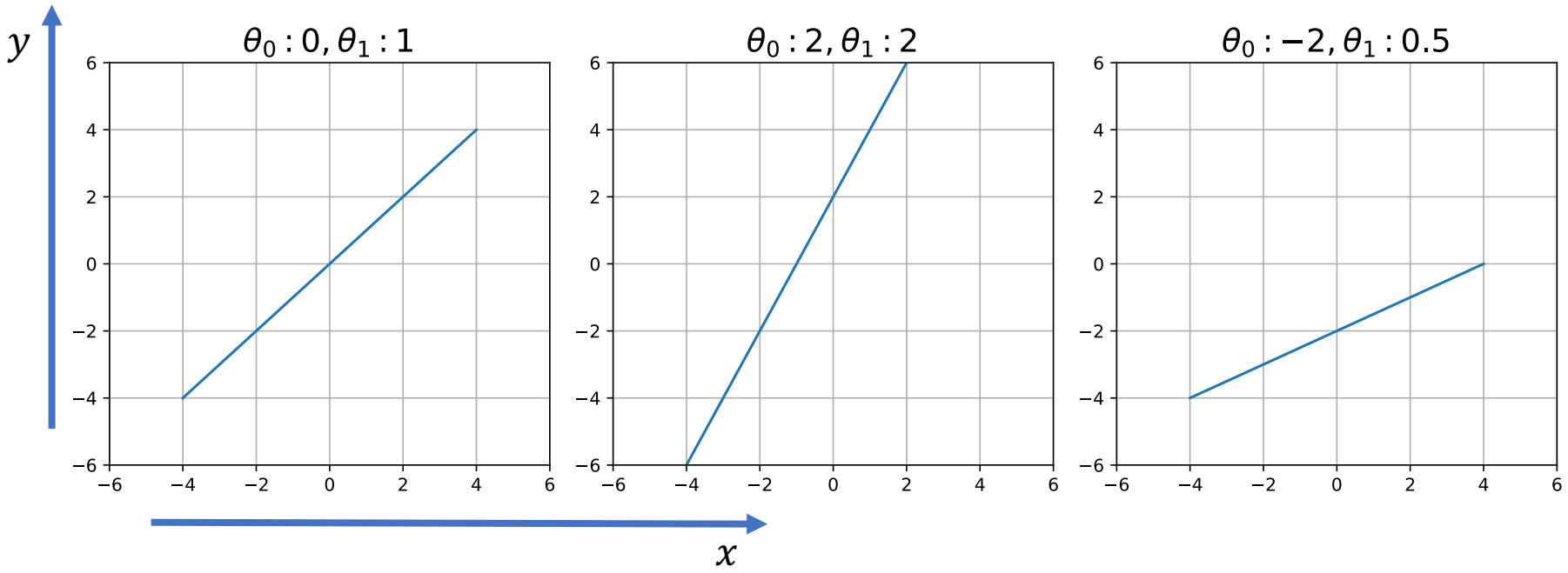
$$Fiyat = a \times Alan + b$$
$$y = ax + b$$

$$h_\theta(x) = \theta_0 + \theta_1 x$$

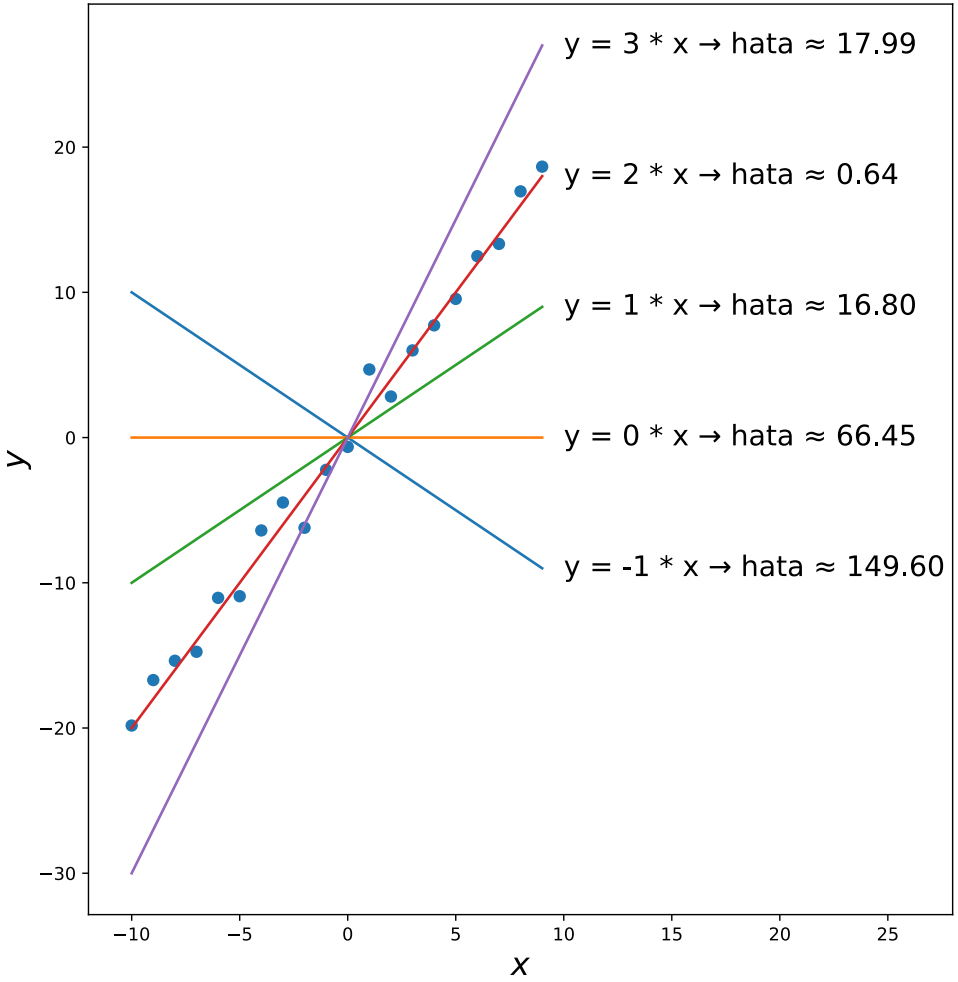
θ_i: Parametreler

Doğrusal Regresyon (Linear Regression)

$$h_\theta(x) = \theta_0 + \theta_1 x$$



Doğrusal Regresyon (Linear Regression)



Hipotez:

$h_\theta(x) = \theta_0 + \theta_1 x$

Parametreler:

θ_0, θ_1

Hata Fonksiyonu (Cost Function):

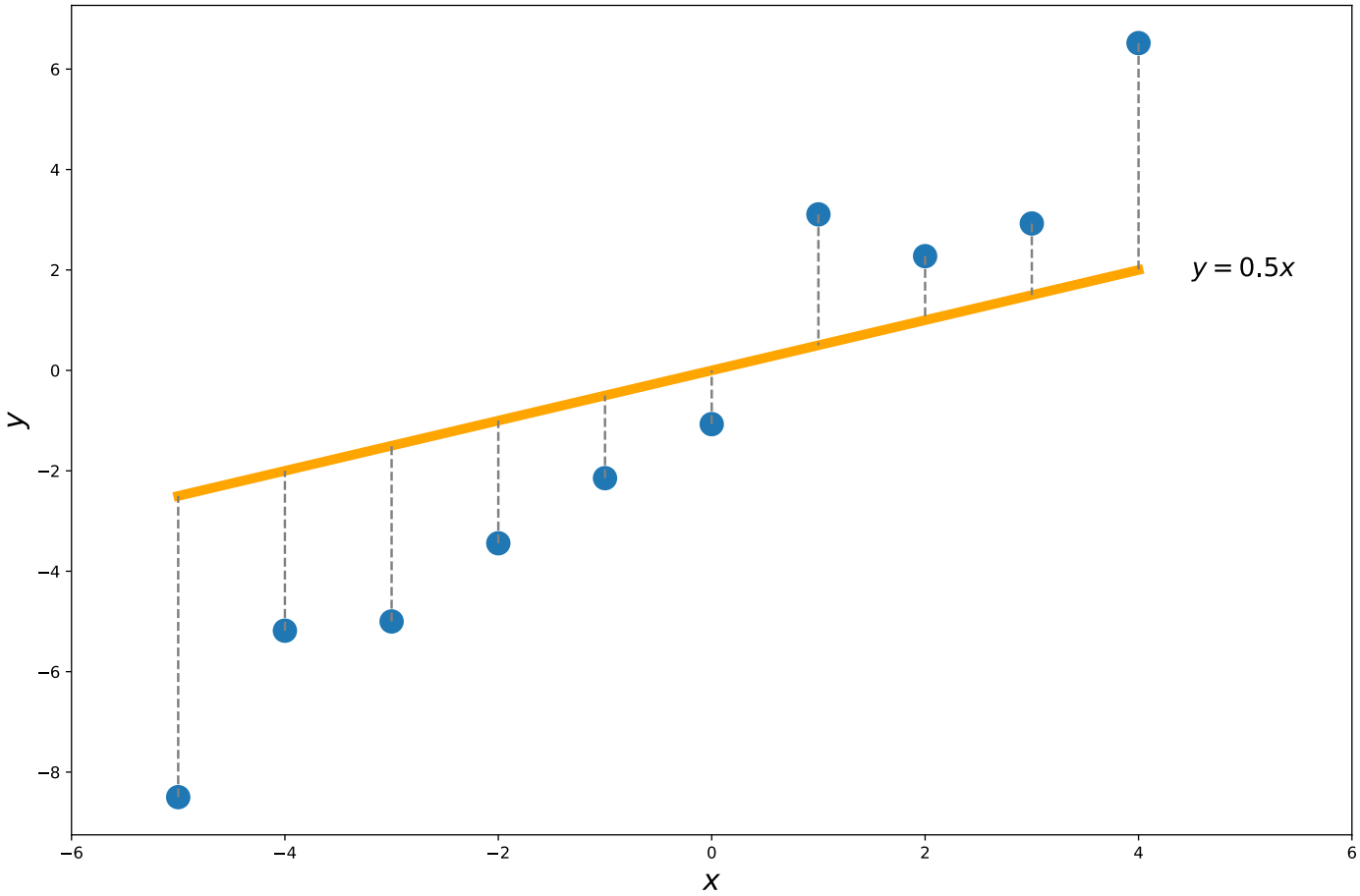
$$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)})^2$$

Hedef:

$$\underset{\theta_0, \theta_1}{\text{minimize}} \; J(\theta_0, \theta_1)$$

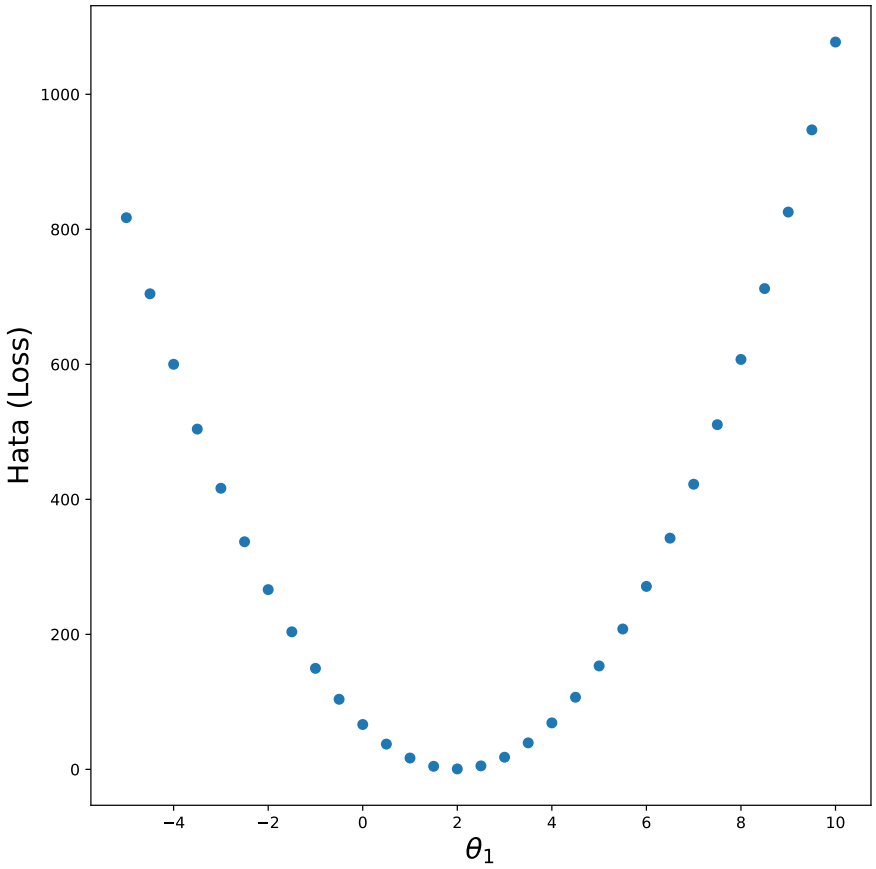
Doğrusal Regresyon (Linear Regression)

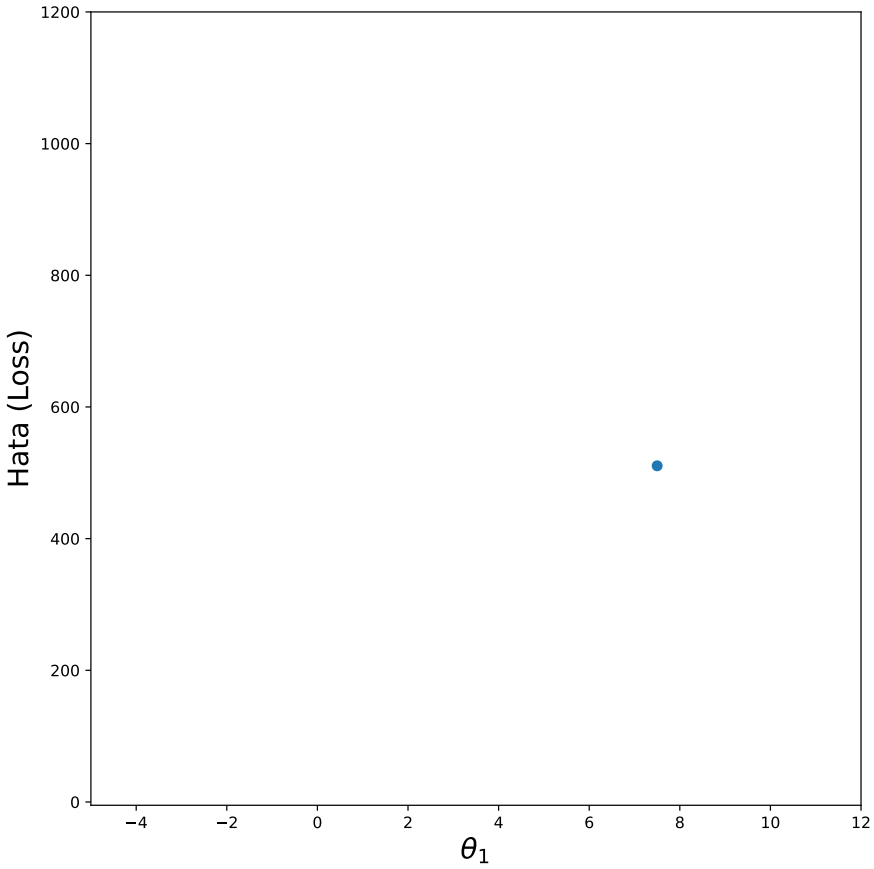
$$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)})^2$$



Doğrusal Regresyon (Linear Regression)

$$h_\theta(x) = \theta_1 x \ (\theta_0 = 0)$$



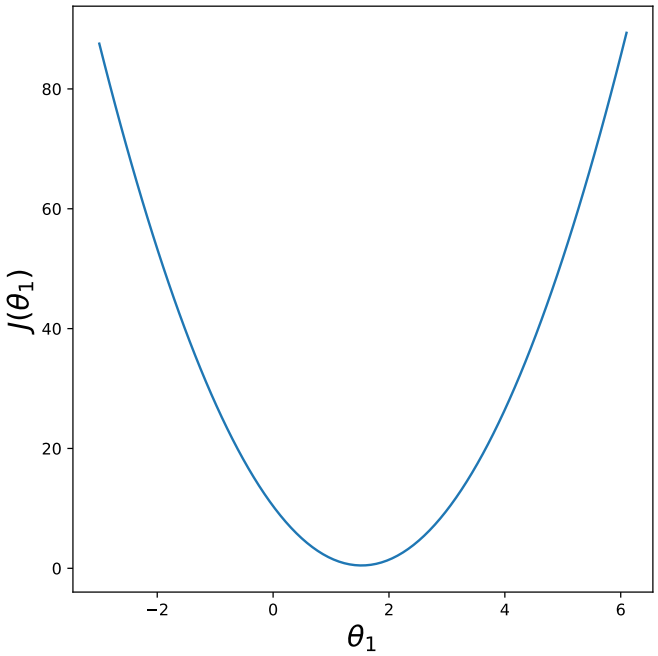


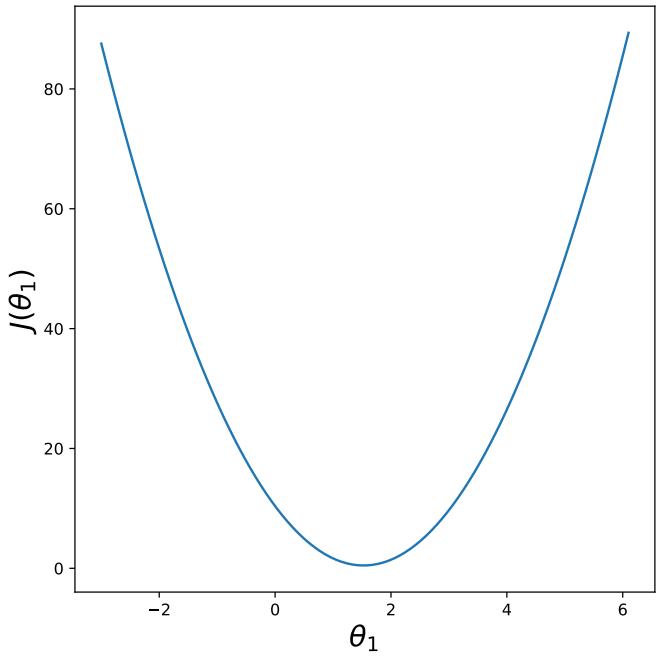
Dereceli Alçalma (Gradient Descent)

$h_\theta(x) = \theta_1 x \quad (\theta_0 = 0)$

$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)})^2$

$J(\theta_1) = \frac{1}{2m} \sum_{i=1}^{m} (\theta_1 x^{(i)} - y^{(i)})^2$



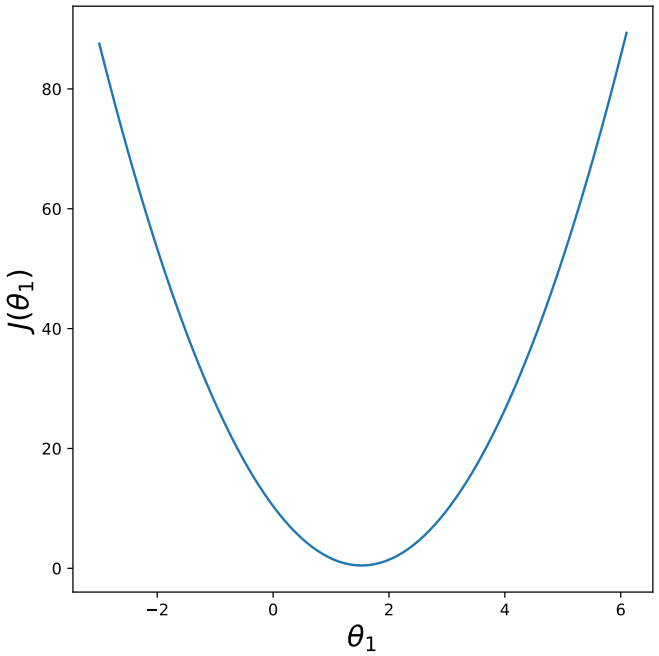


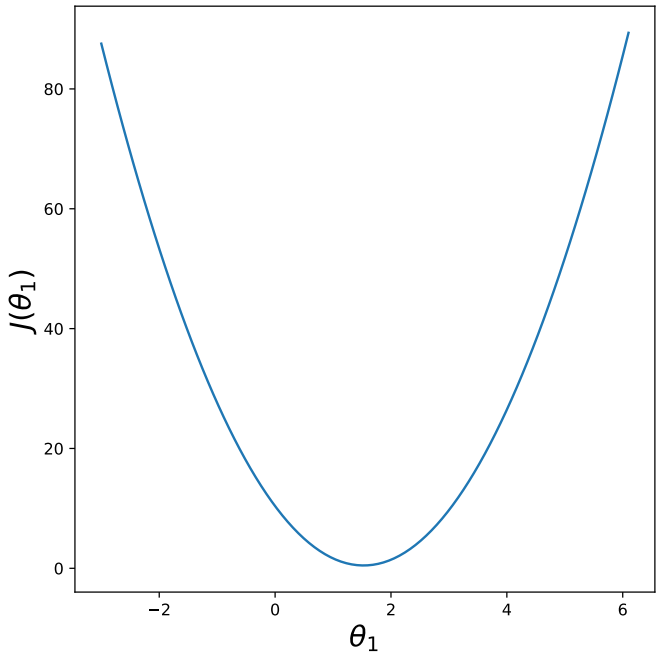
Dereceli Alçalma (Gradient Descent)

$$J(\theta_1) = \frac{1}{2m} \sum_{i=1}^{m} (\theta_1 x^{(i)} - y^{(i)})^2$$

$$\theta_1 := \theta_1 - \alpha \frac{\partial}{\partial \theta_1} J(\theta_1)$$

α $\Rightarrow$ öğrenme hızı (learning rate)

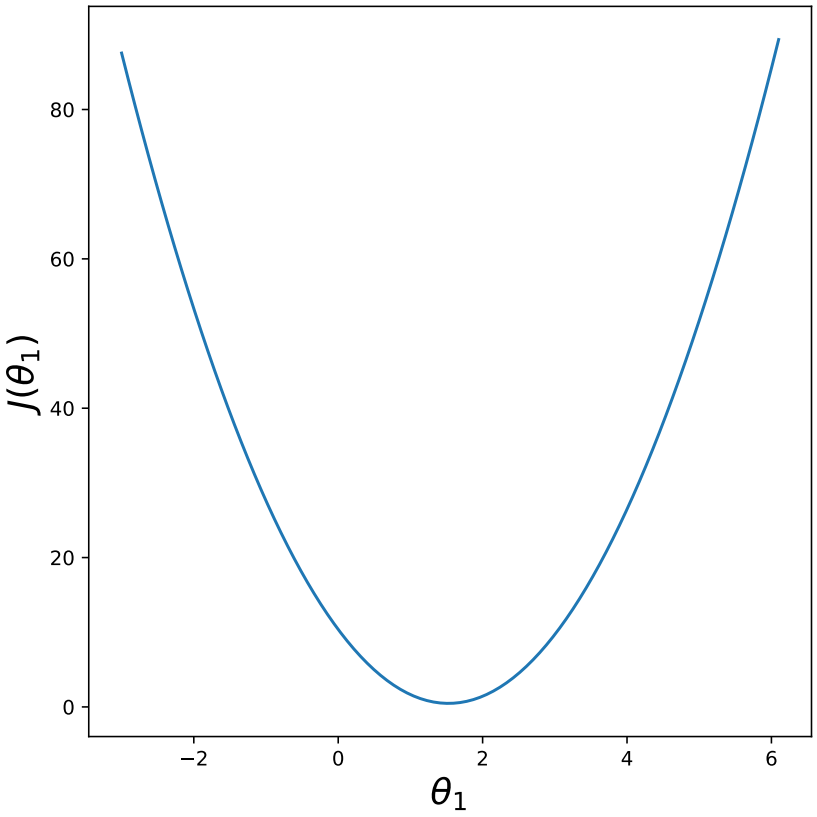




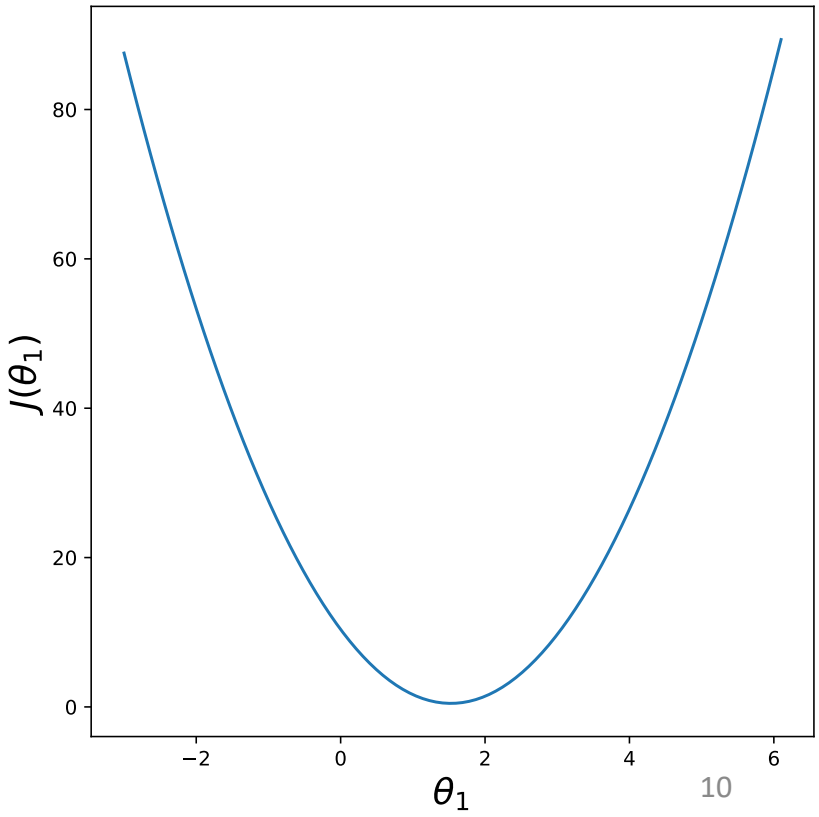
Öğrenme Hızı (Learning rate)

$$\theta_1 \coloneqq \theta_1 - \alpha \frac{\partial}{\partial \theta_1} J(\theta_1)$$

α çok büyük ise



α çok küçük ise



Dereceli Alçalma (Gradient Descent)

$$h_\theta(x) = \theta_0 + \theta_1 x$$

$$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)})^2 = \frac{1}{2m} \sum_{i=1}^{m} (\theta_0 + \theta_1 x^{(i)} - y^{(i)})^2$$

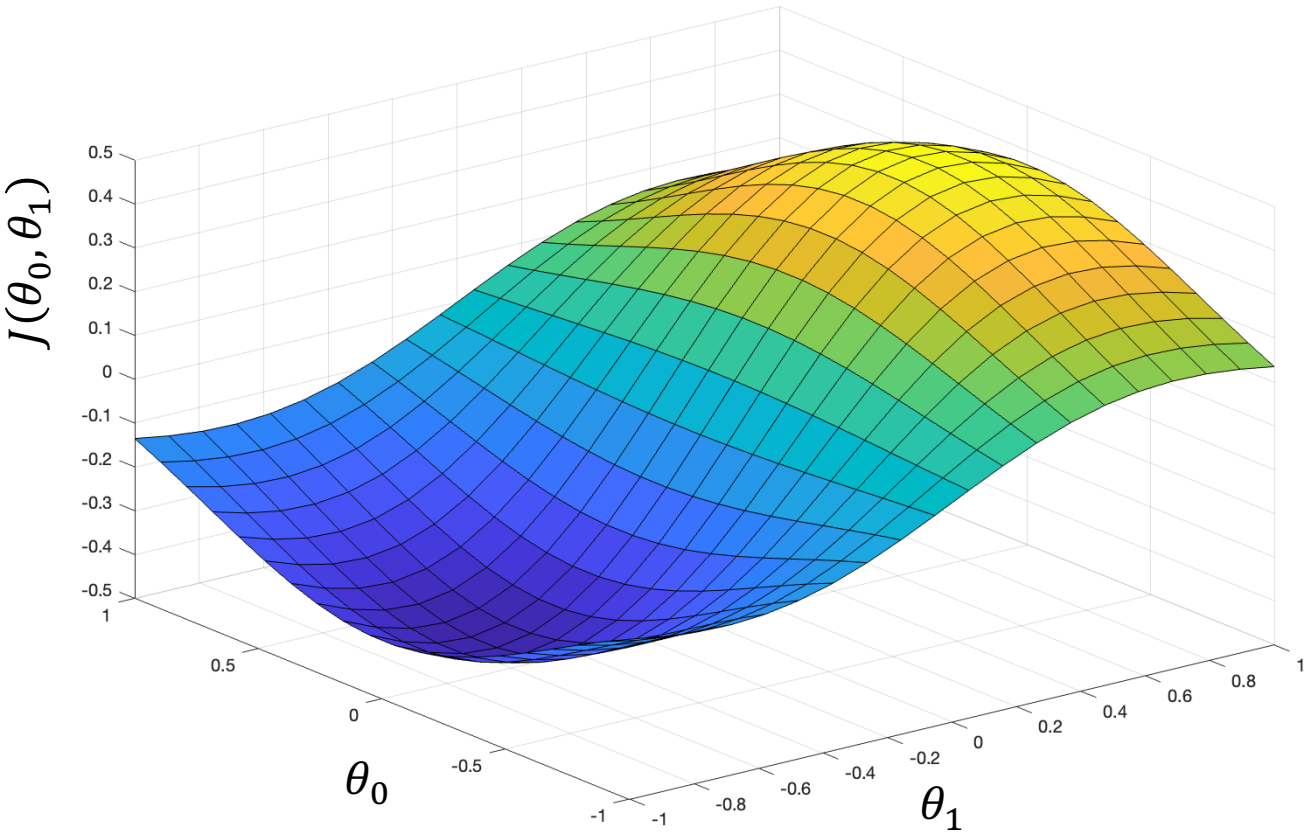
$$\theta_0 := \theta_0 - \alpha \frac{\partial}{\partial \theta_0} J(\theta_0, \theta_1)$$

$$\theta_1 := \theta_1 - \alpha \frac{\partial}{\partial \theta_1} J(\theta_0, \theta_1)$$

$$\frac{\partial}{\partial \theta_0} J(\theta_0, \theta_1) = \frac{1}{m} \sum_{i=1}^{m} (\theta_0 + \theta_1 x^{(i)} - y^{(i)})$$

$$\frac{\partial}{\partial \theta_1} J(\theta_0, \theta_1) = \frac{1}{m} \sum_{i=1}^{m} (\theta_0 + \theta_1 x^{(i)} - y^{(i)}) \cdot x^{(i)}$$

Dereceli Alçalma (Gradient Descent)



Doğrusal Regresyon Algoritması

Doğrusal Regresyon Modeli:

$$h_\theta(x) = \theta^T x = \theta_0 x_0 + \theta_1 x_1 + \theta_2 x_2 + \cdots + \theta_n x_n$$

$$J(\theta_0, \theta_1, \theta_2, \ldots, \theta_n) = J(\theta) = \frac{1}{2m} \sum_{i=1}^{m} (h_\theta(x^{(i)}) - y^{(i)})^2$$

Dereceli Alçalma:

Yakınsayana kadar tekrar et {

$$\theta_j := \theta_j - \alpha \frac{\partial}{\partial \theta_j} J(\theta)$$

}

Model Eğitimi

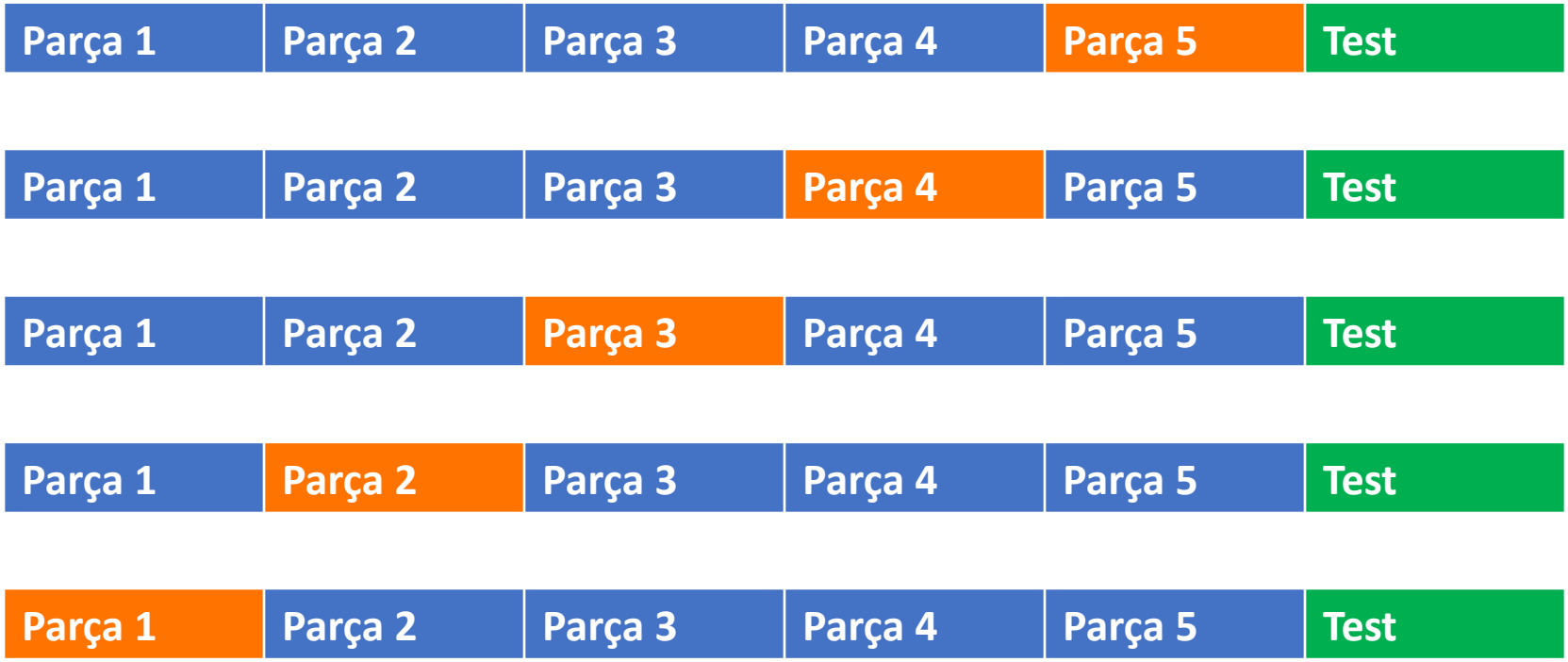
1. Fikir: Elimizdeki verilerin tamamıyla modeli eğitmek.

2. Fikir: Elimizdeki verilerin bir kısmıyla modeli eğitmek. Kalan kısmıyla modelin başarısını ölçmek.

3. Fikir: Elimizdeki verilerin bir kısmıyla modeli eğitmek. Bir kısmıyla modelin sağlığını ölçmek. Son kısımla gerçek başarıyı hesaplamak.

Model Eğitimi

4. Fikir: Çapraz doğrulama (Cross validation).



Makine Öğrenmesi Genel Akışı

```
X, y = veriyi_hazirla(veri_seti)

X_train, X_val, X_test,
y_train, y_val, y_test = veriyi_böl(X, y, 0.7, 0.2, 0.1)

model = new DoğrusalRegresyonModeli()
model.fit(X_train, y_train)
y_tahmin = model.predict(X_val)
basari = basari_olc(y_tahmin, y_val)

nihai_basari = basari_olc( model_predict(X_test), y_test )
```