Necessary and Sufficient Condition for a Solution

1/1 point (graded)

In the above video lecture, we verified the following result:

Computing the gradient of

$$R_n(\theta) = \frac{1}{n}\sum_{t=1}^{n} \frac{\left(y^{(t)} - \theta \cdot x^{(t)}\right)^2}{2},$$

we get

$$\nabla R_n(\theta) = A\theta - b\,(=0) \quad \text{where } A = \frac{1}{n}\sum_{t=1}^{n} x^{(t)}\left(x^{(t)}\right)^T,\ b = \frac{1}{n}\sum_{t=1}^{n} y^{(t)} x^{(t)}.$$

Now, what is the necessary and sufficient condition that $A\theta - b = 0$ has a unique solution?

- ○ None of A's entries is 0.
- ◉ A is invertible. ✔
- ○ A's dimension is the same as that of θ's

Solution:

For any square matrix A, $A\theta - b = 0$ has a unique solution $\theta = A^{-1}b$ if and only if A is invertible.

Submit

You have used 1 of 1 attempt

Answers are displayed within the problem