8. Regularization

Ridge Regression

9:51 / 9:51 1.0x

regression formula, apply gradient-based algorithm,

and to find the best theta.

In the homework, you will see-- in the exercise,

you will see how you can do the same kind of modification,

very straightforward modification,

to get a solution for this objective for the closed form

algorithm.

End of transcript. Skip to the start.

Video

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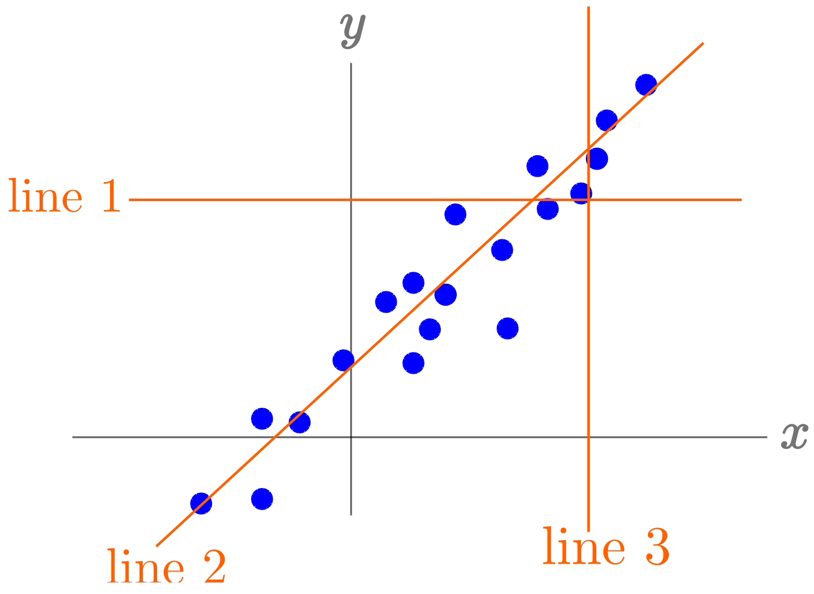
Regularization: extreme case 1

1/1 point (graded)

As in the video above, define the loss function

$$J_{n,\lambda}\left(\theta,\theta_0\right) = \frac{1}{n}\sum_{t=1}^{n}\frac{\left(y^{(t)}-\theta\cdot x^{(t)}-\theta_0\right)^2}{2}+\frac{\lambda}{2}\|\theta\|^2$$

where λ is the regularization factor.



In the figure above, the blue dots are the training examples. If we increase λ to ∞, where does $f(x) = \theta \cdot x + \theta_0$ converge to?

- (selected) line 1 ✔
- line 2
- line 3

Solution:

If we increase λ to ∞, minimizing J is equivalent to minimizing $||\theta||$. Thus θ will have to be a zero vector. Thus $f(x) = \theta \cdot x + \theta_0$ becomes $f(x) = \theta_0$, a horizontal line. Thus f converges to line 1.

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You have used 1 of 2 attempts

Answers are displayed within the problem

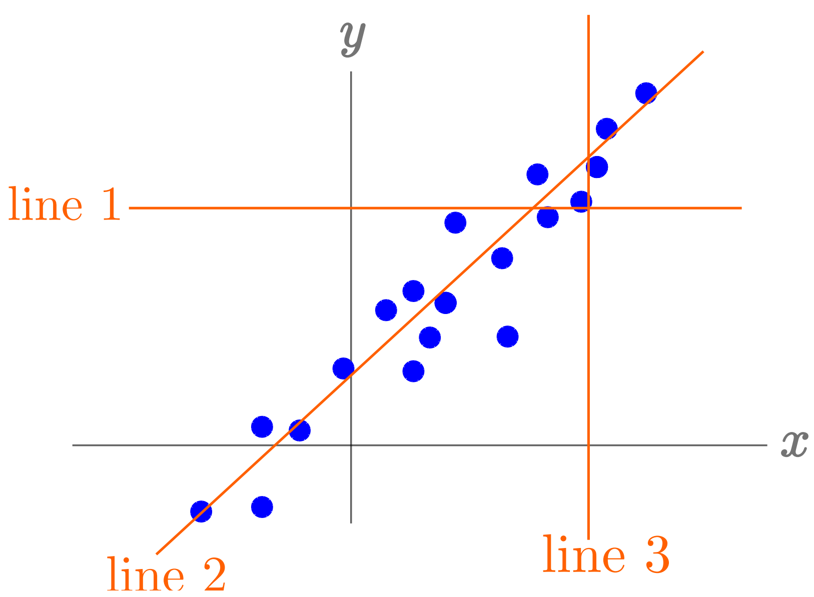
Regularization: Extreme case 2

1/1 point (graded)

As in the problem above,

$$J_{n,\lambda}(\theta, \theta_0) = \frac{1}{n} \sum_{t=1}^{n} \frac{\left(y^{(t)} - \theta \cdot x^{(t)} - \theta_0\right)^2}{2} + \frac{\lambda}{2} ||\theta||^2$$

where λ is the regularization factor.



In the figure above, the blue dots are the training examples. If we decrease λ to 0, where does $f(x) = \theta \cdot x + \theta_0$ converge to?

- line 1
- line 2 ✔
- line 3

Solution:

If we decrease λ to zero, minimizing J is equivalent to minimizing $\frac{1}{n}\sum_{t=1}^{n}\frac{\left(y^{(t)}-\theta\cdot x^{(t)}-\theta_0\right)^2}{2}$, which is the "fit." Thus f converges to line 2.

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You have used 1 of 2 attempts

Answers are displayed within the problem

Discussion

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Topic: Unit 2 Nonlinear Classification, Linear regression, Collaborative Filtering (2 weeks):Lecture 5. Linear Regression / 8. Regularization