



3

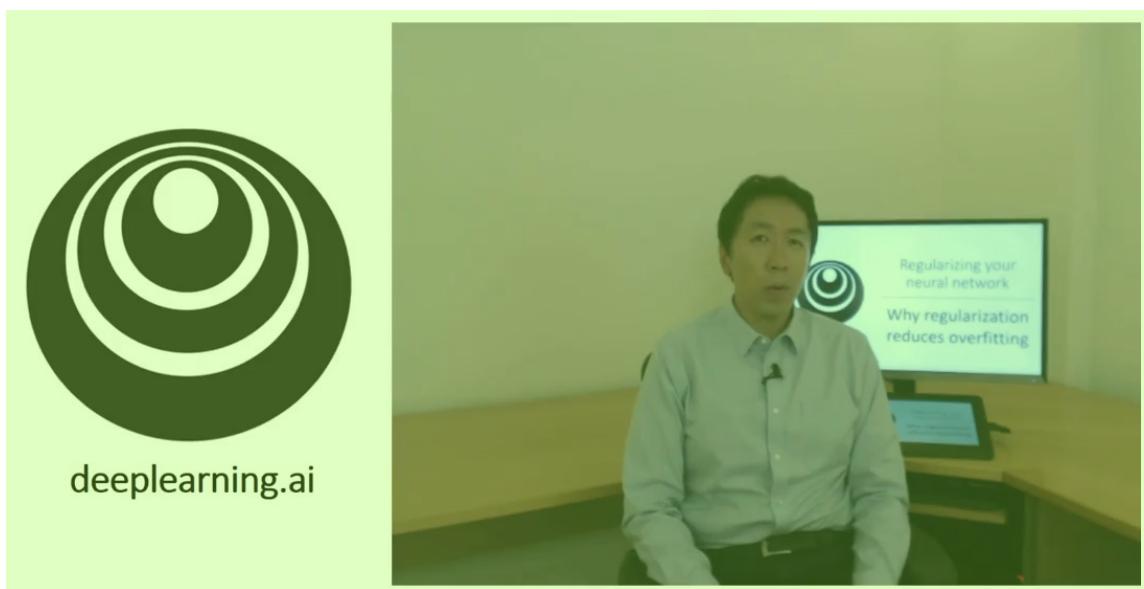
Regularizing your<sup>2</sup>  
neural network

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Why regularization<sup>4</sup>  
reduces overfitting

↳

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[■ 2 ■ / ■ 26 ■  
■■: keyframe\_00-00-03-000\_0001.jpg



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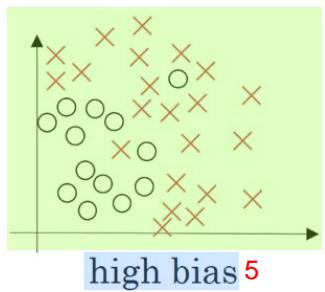
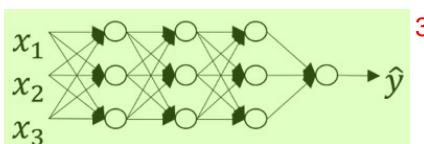
Regularizing your<sup>2</sup>  
neural network

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Why regularization<sup>4</sup>  
reduces overfitting

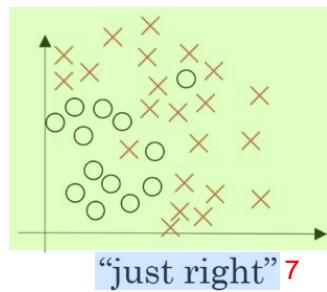
↳

## How does regularization prevent overfitting?<sup>2</sup>



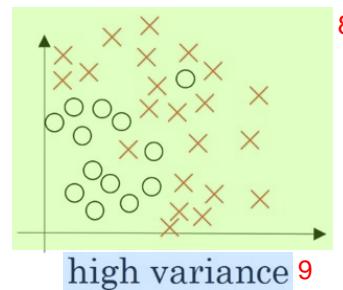
4

high bias 5



6

“just right” 7

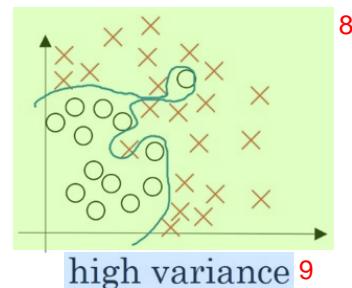
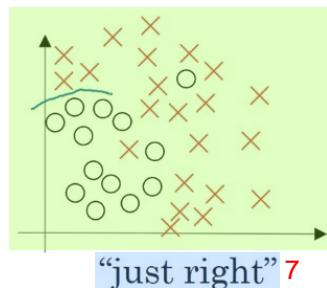
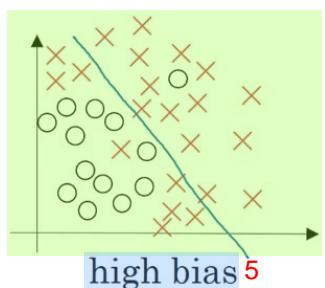
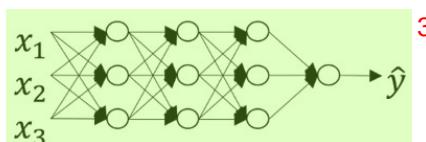


8

high variance 9

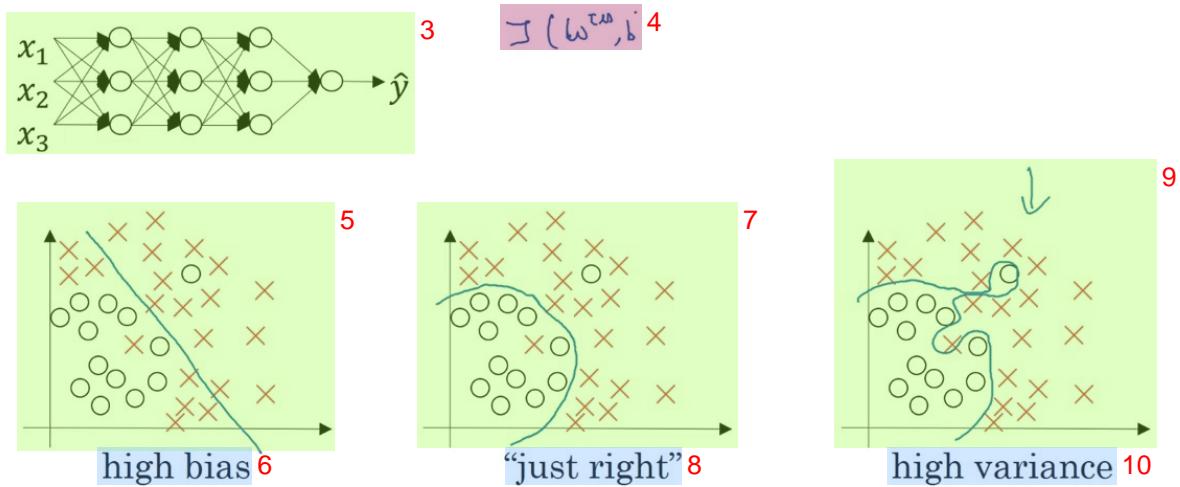
Andrew Ng 10

## How does regularization prevent overfitting?<sup>2</sup>



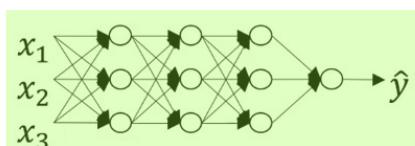
Andrew Ng 10

## How does regularization prevent overfitting? <sup>2</sup>



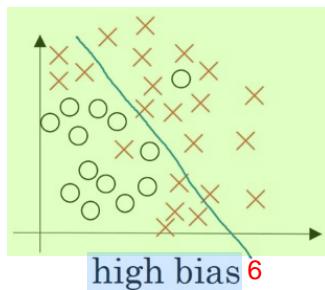
Andrew Ng 11

## How does regularization prevent overfitting?<sup>2</sup>

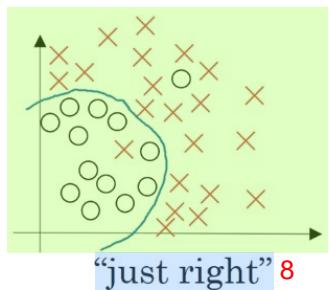


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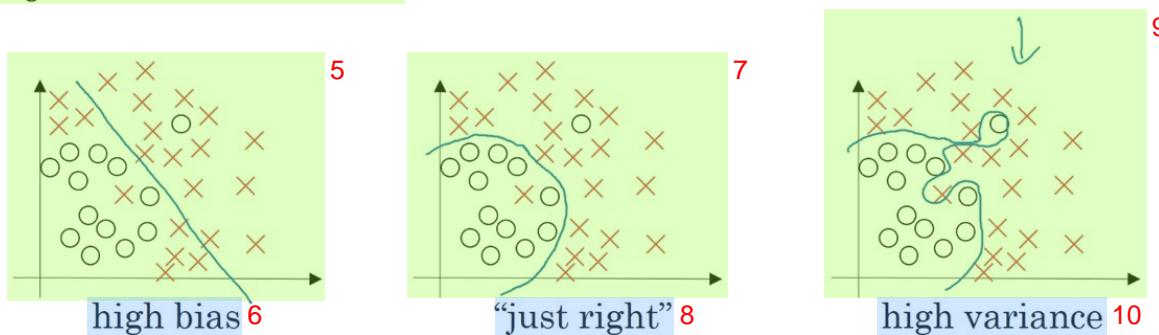
$$J(\omega^{(0)}, b^{(0)}) = \frac{1}{m} \sum_{i=1}^m L(y_i^{(0)}, \hat{y}_i^{(0)}) + \frac{\lambda}{2m} \sum_{l=1}^L \|\omega^{(l)}\|_2^2$$



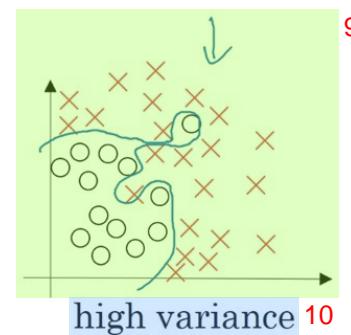
5



7



“just right” 8

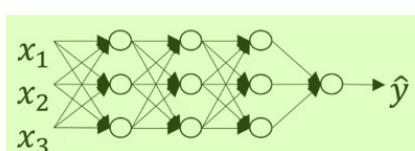


high variance 10

9

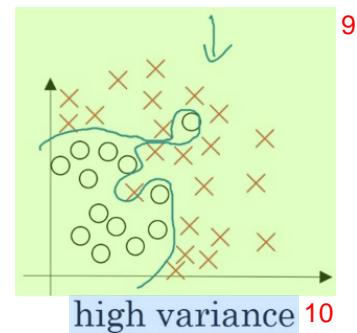
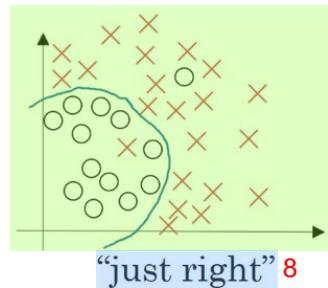
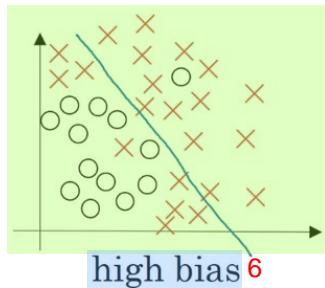
Andrew Ng 11

## How does regularization prevent overfitting? <sup>2</sup>



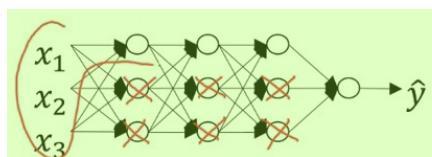
$$J(\omega^{(m)}, b^{(m)}) = \frac{1}{m} \sum_{i=1}^m L(y_i^{(i)}, \hat{y}_i^{(i)}) + \frac{\lambda}{2m} \sum_{l=1}^L \|\omega^{(l)}\|_F^2$$

4



Andrew Ng 11

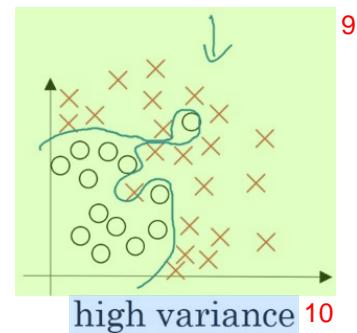
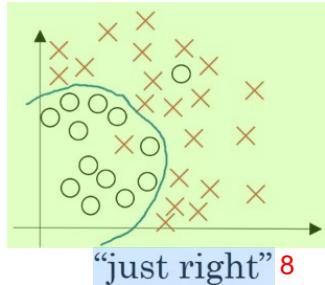
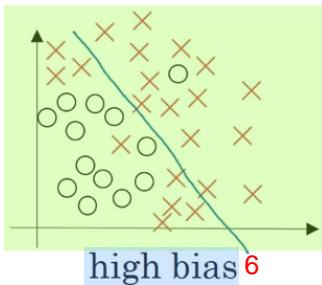
## How does regularization prevent overfitting? <sup>2</sup>



$$J(\omega^{(m)}, b^{(m)}) = \frac{1}{m} \sum_{i=1}^m L(y_i^{(i)}, \hat{y}_i^{(i)}) + \frac{\lambda}{2m} \sum_{l=1}^L \|\omega^{(l)}\|_F^2$$

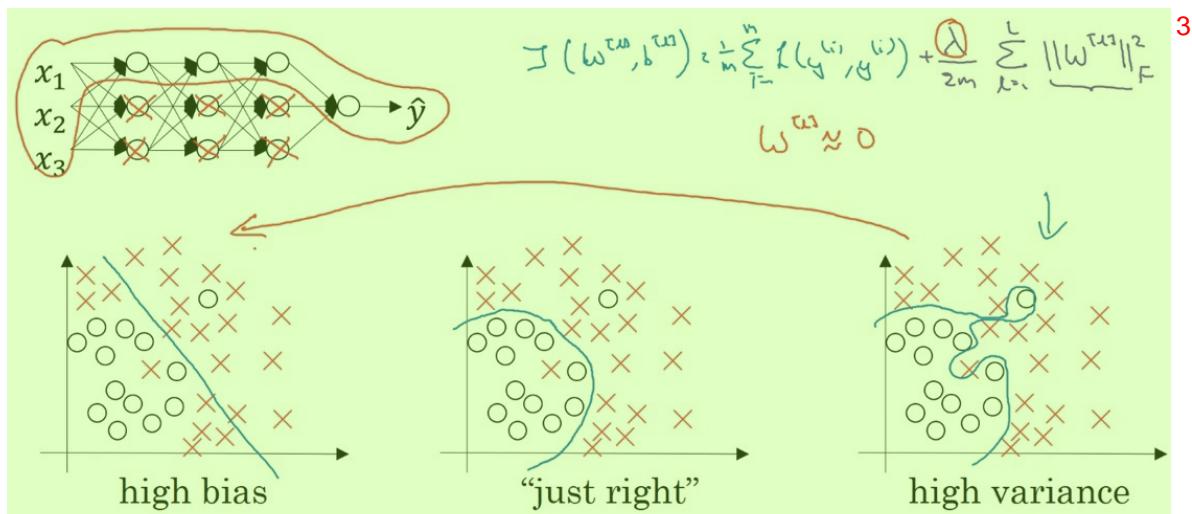
$\omega^{(l)} \approx 0$

4



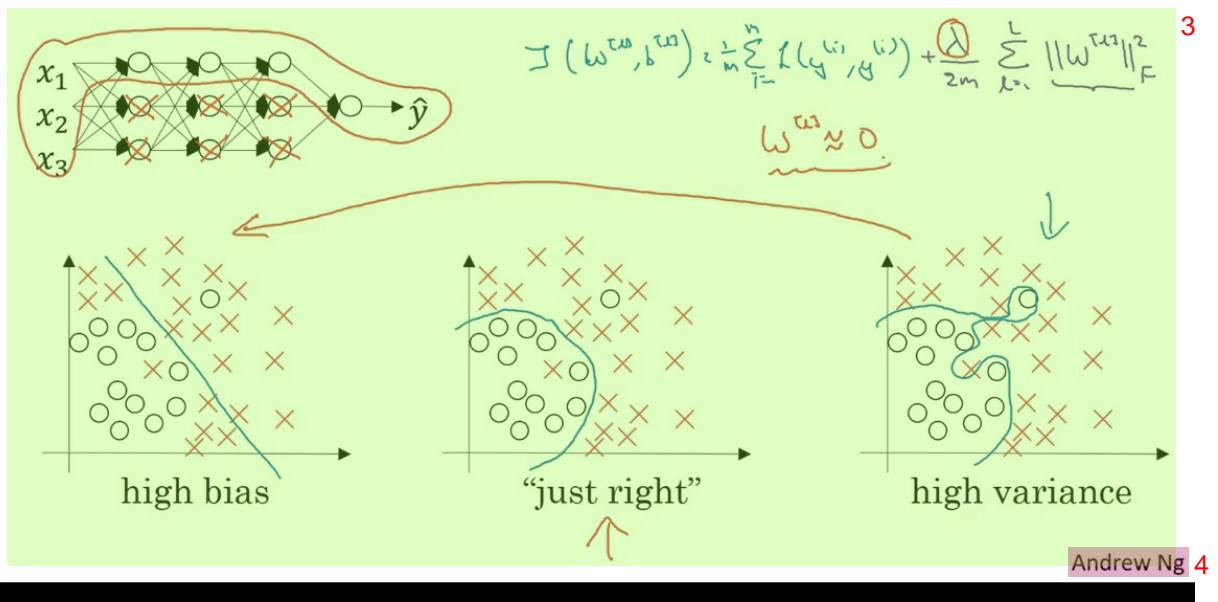
Andrew Ng 11

## How does regularization prevent overfitting?<sup>2</sup>

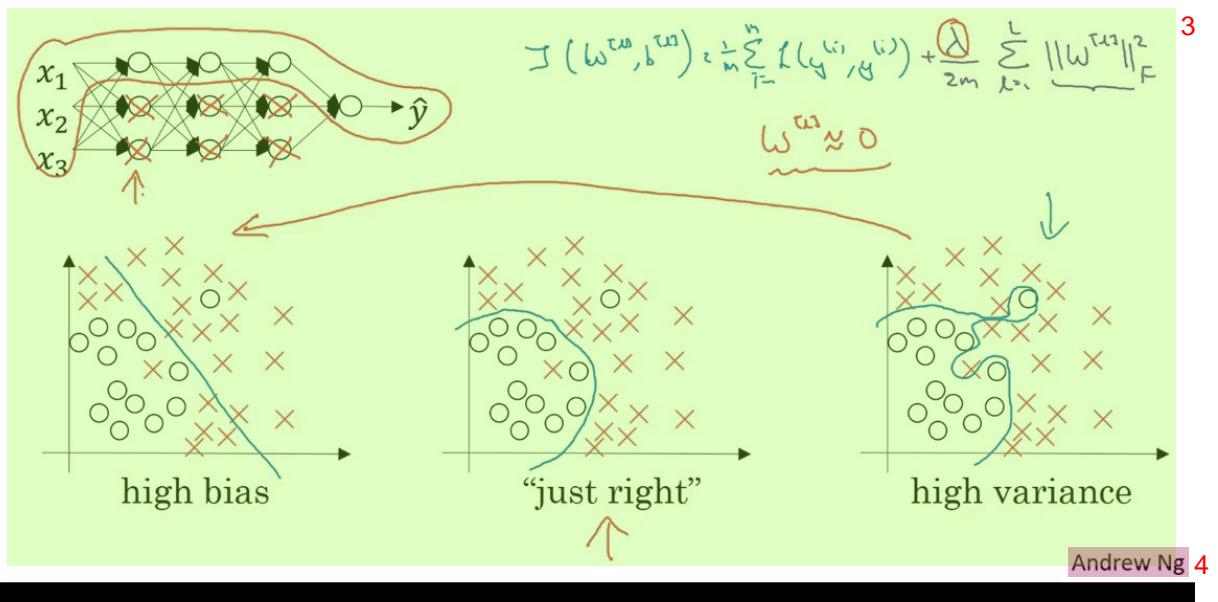


Andrew Ng 4

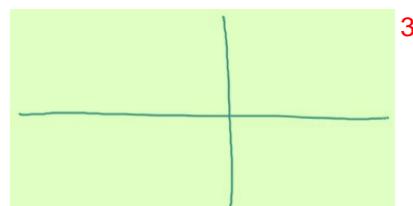
## How does regularization prevent overfitting? <sup>2</sup>



## How does regularization prevent overfitting? <sup>2</sup>



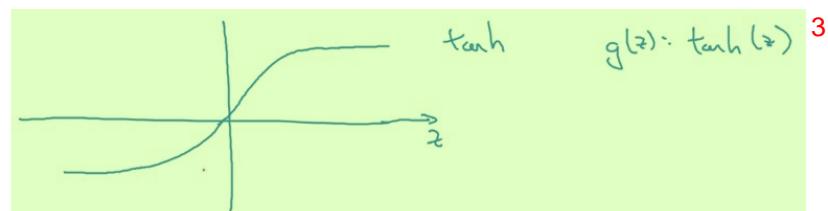
How does regularization prevent overfitting?<sup>2</sup>



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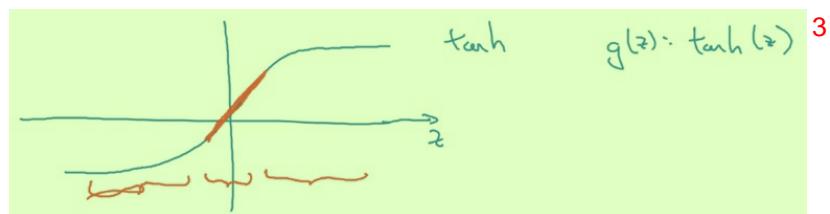
Andrew Ng

## How does regularization prevent overfitting?<sup>2</sup>



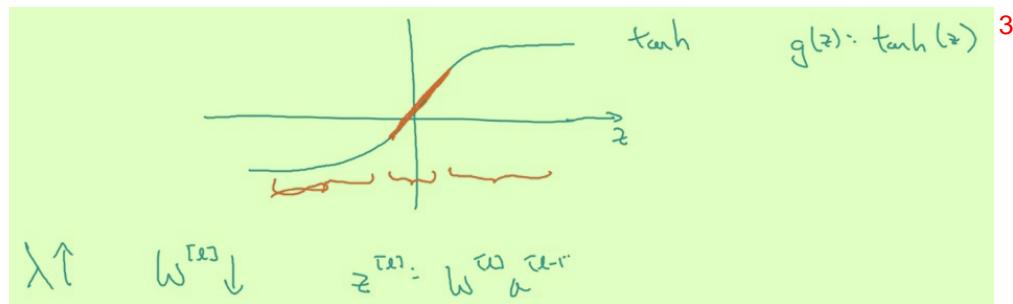
Andrew Ng

## How does regularization prevent overfitting?<sup>2</sup>



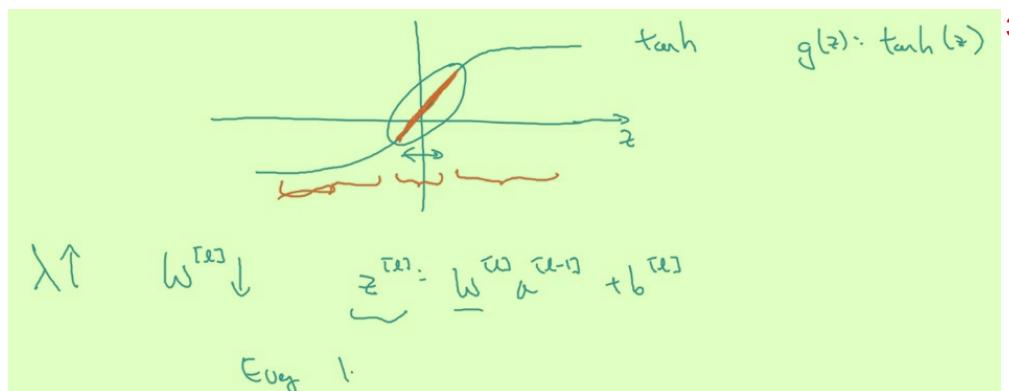
Andrew Ng

## How does regularization prevent overfitting? <sup>2</sup>



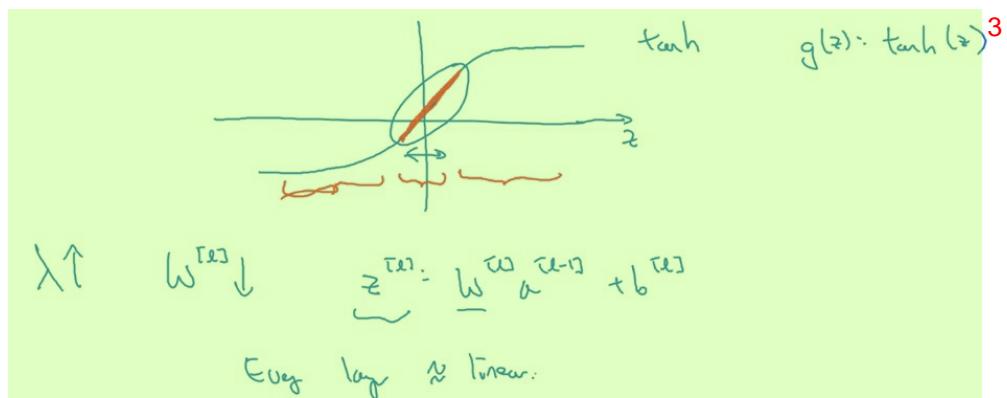
Andrew Ng

## How does regularization prevent overfitting? <sup>2</sup>



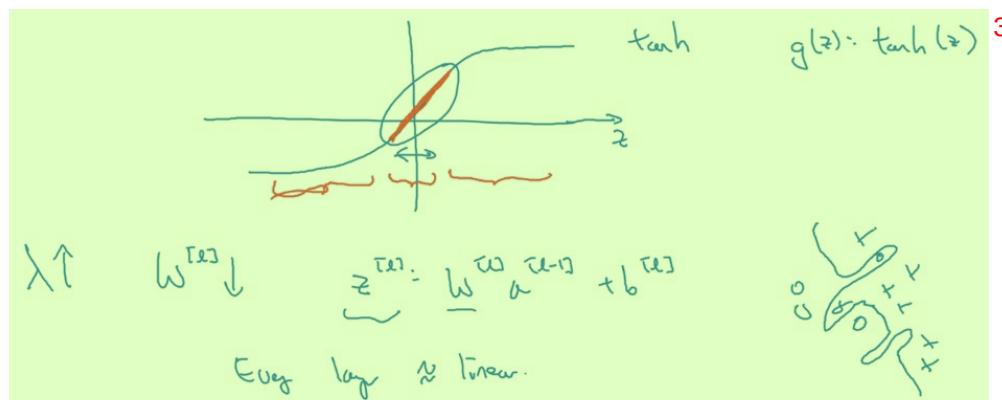
Andrew Ng

## How does regularization prevent overfitting? <sup>2</sup>



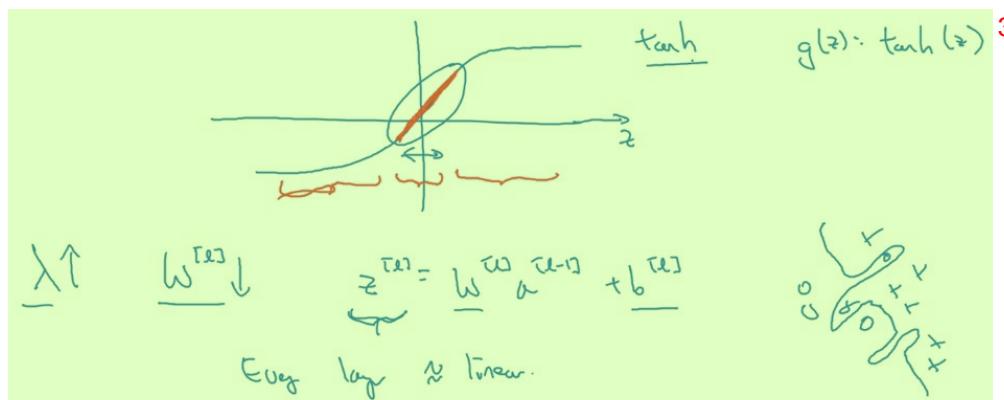
Andrew Ng

## How does regularization prevent overfitting?<sup>2</sup>



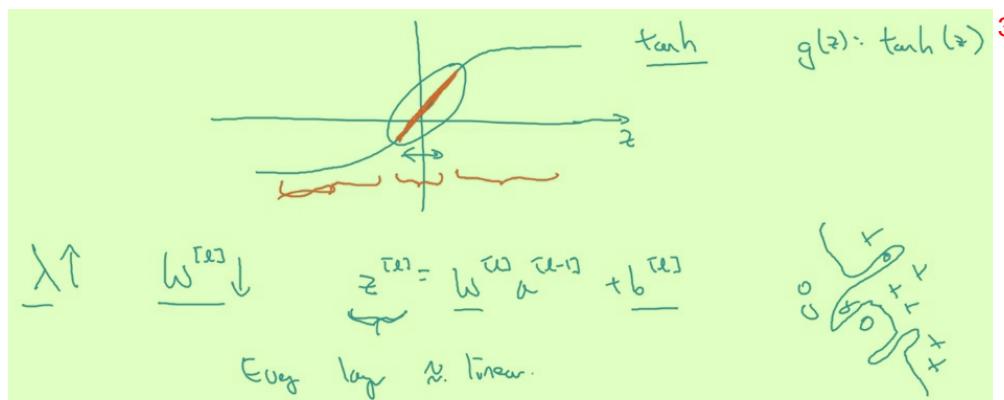
Andrew Ng

## How does regularization prevent overfitting? <sup>2</sup>



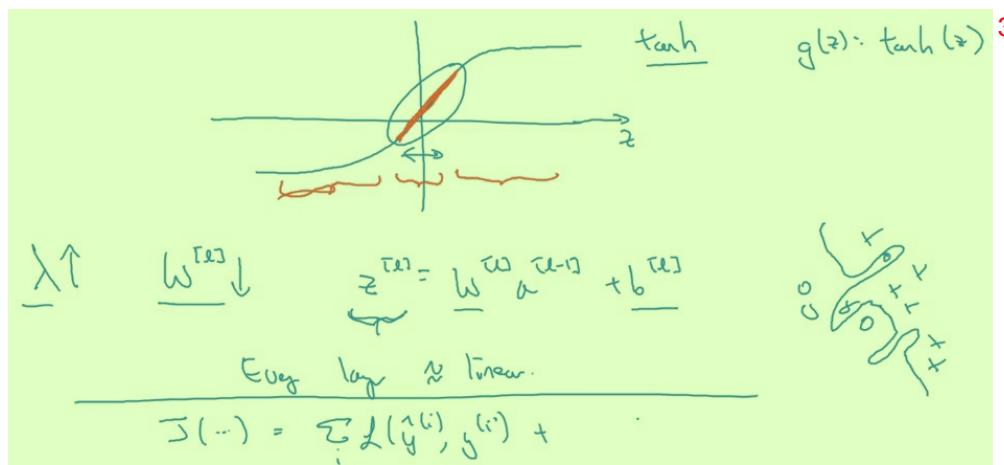
Andrew Ng

## How does regularization prevent overfitting? <sup>2</sup>



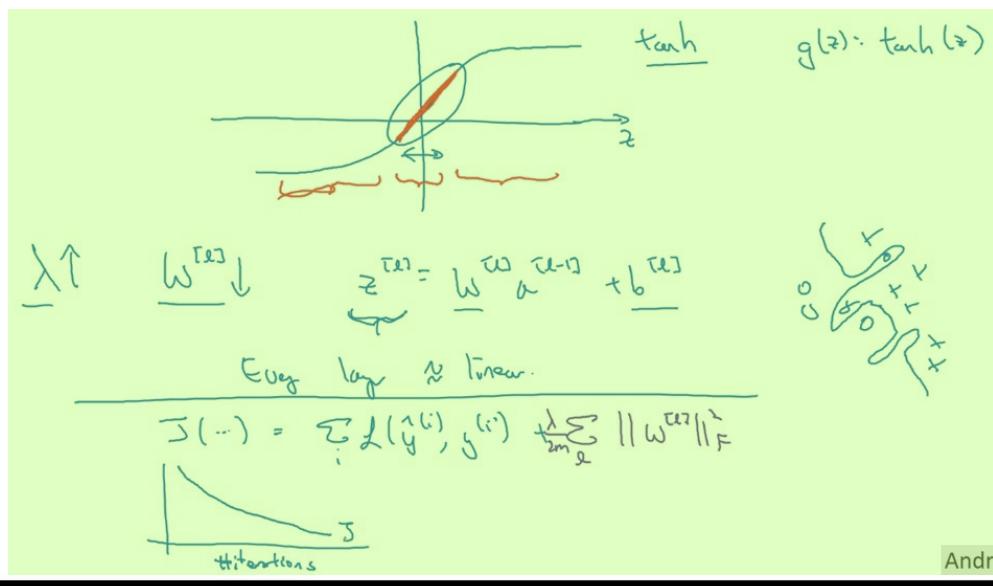
Andrew Ng

## How does regularization prevent overfitting? <sup>2</sup>

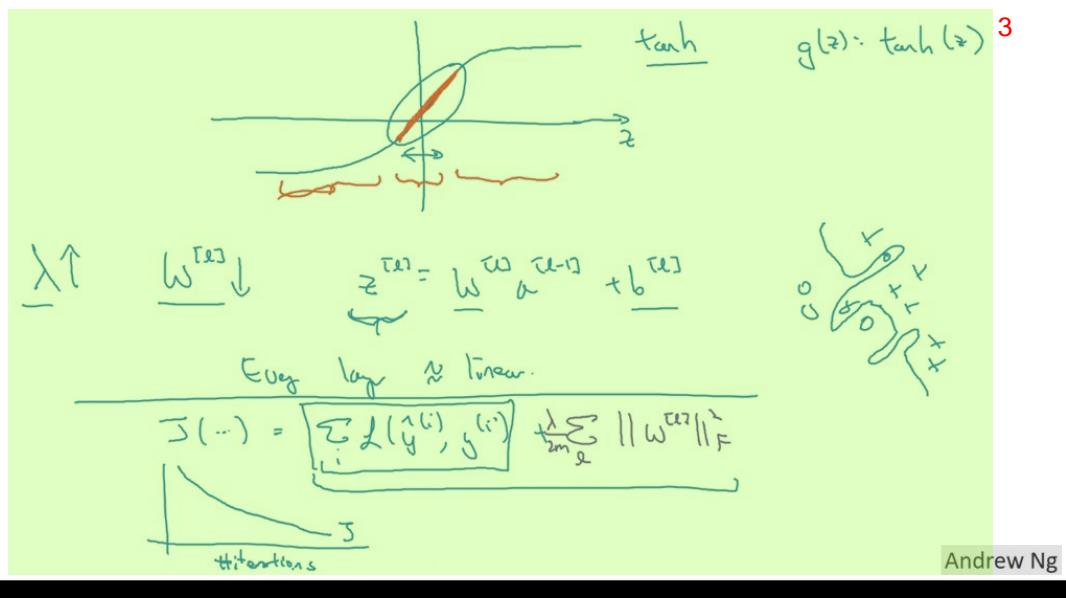


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## How does regularization prevent overfitting? <sup>2</sup>



## How does regularization prevent overfitting? <sup>2</sup>



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How does regularization prevent overfitting? 2 3 4 5



Andrew Ng 5

[■■■: 00:07:00.000] 1

