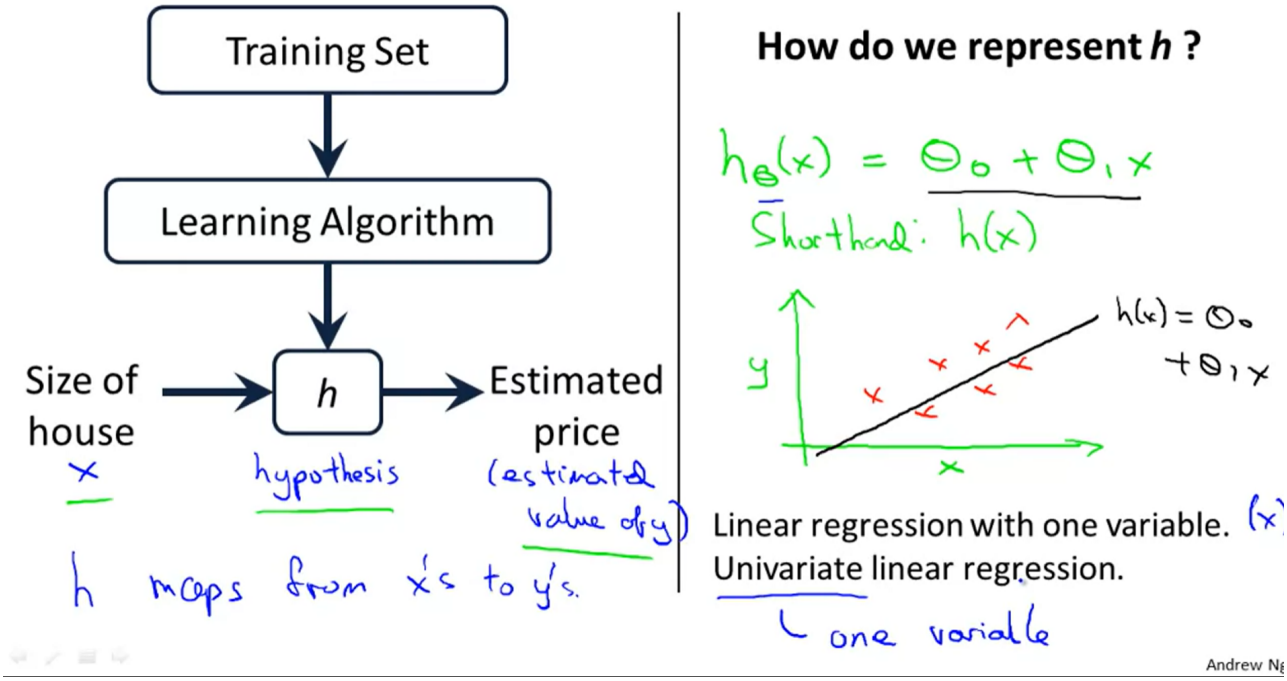
Week 1.2 Linear Regression with One Variable

Model Representation

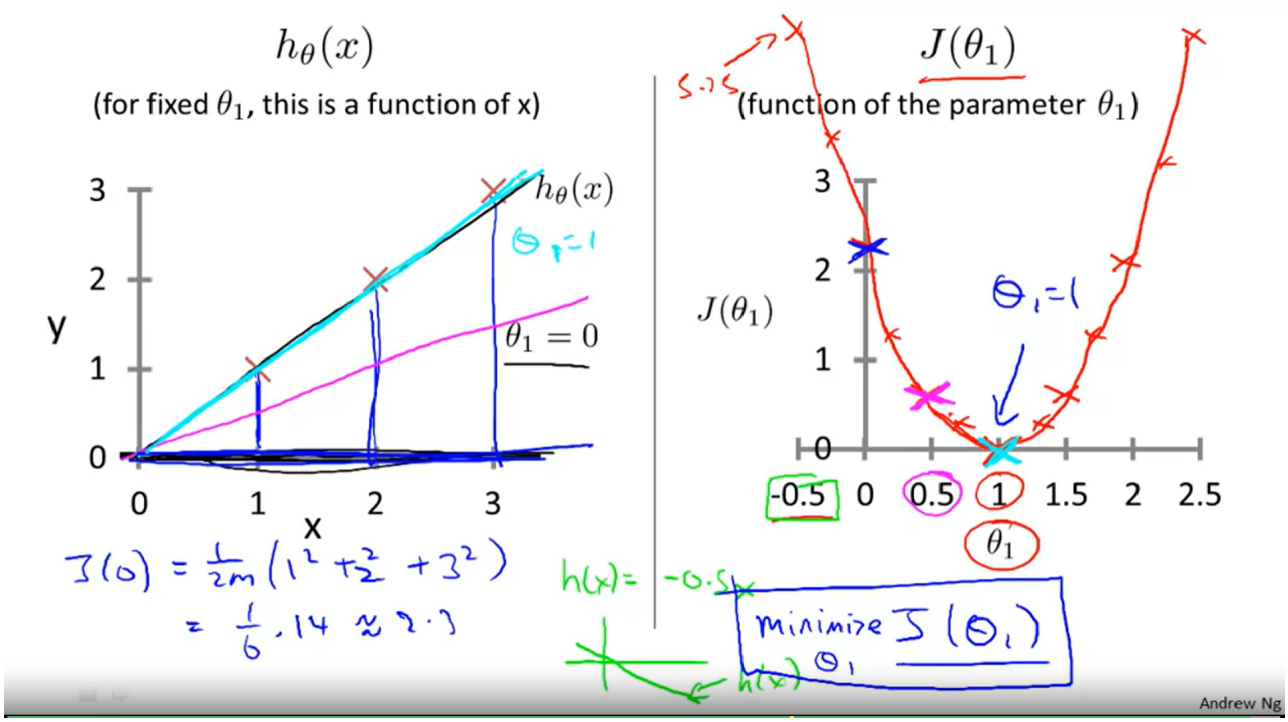
- Notation:
  + m: Number of training examples
  + x's: "input" variable/features
  + y's: "output" variable/"target" variable
  + (x, y) one training example
  + (x^i, y^i) i-th training example



Cost Function

- Hypothesis: $h_\theta(x) = \theta_0 + \theta_1 x$
- Parameters: $\theta_i' s$
- Idea: Choose θ_0, θ_1 so that $h_\theta(x)$ is close to y for our training examples (x, y)
- Cost Function (squared error function):

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


$h_\theta(x)$
(for fixed θ_1, this is a function of x)
$h_\theta(x)$
$\theta_1 = 0$
y
x
0
1
2
3
$J(\theta_1)$
(function of the parameter θ_1)
$J(\theta_1)$
θ_1
-0.5
0
0.5
1
1.5
2
2.5
$\theta_1=1$
$J(0) = \frac{1}{2m}(1^2+2^2+3^2)$
$= \frac{1}{6}.14 \approx 2.3$
h(x)= -0.5x
minimize $J(\theta_1)$
θ_1
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