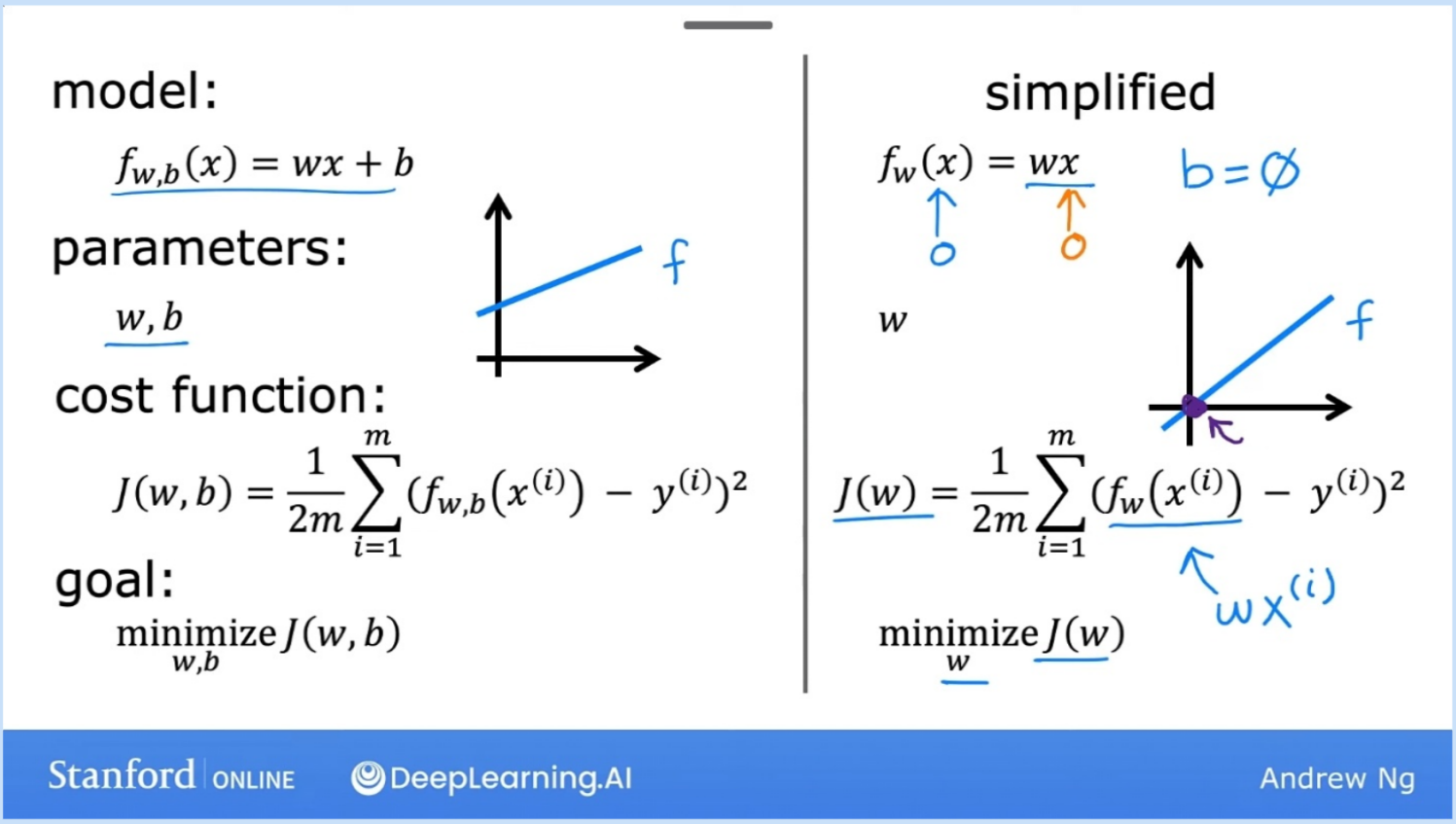
→ Cost function in detail



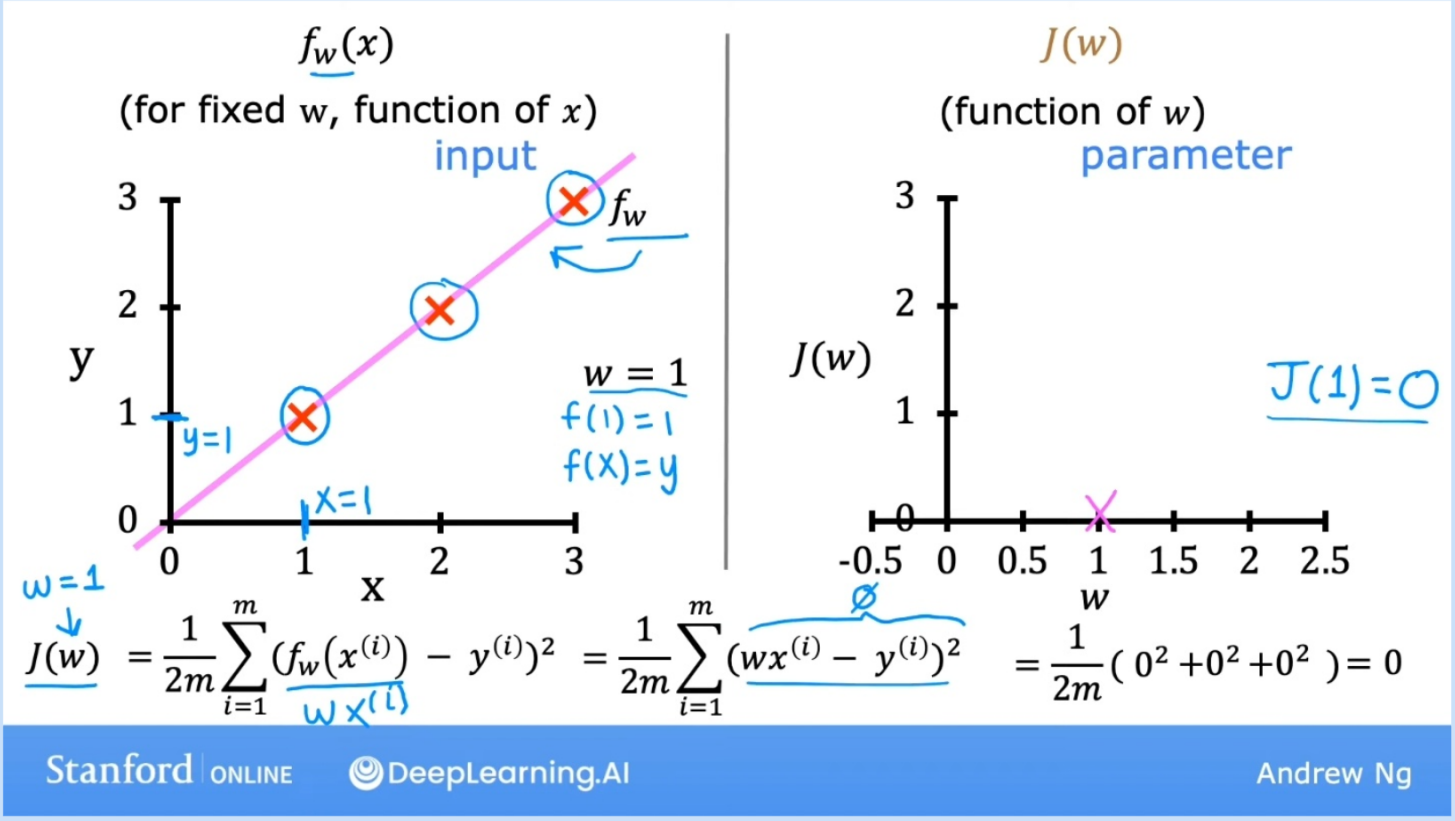
→ The goal is to select w and b in a way that minimize the cost function J(w, b)

→ To understand better we that simplify the function.

→ Assume b = 0, so we have

$$f_w(x) = wx$$

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

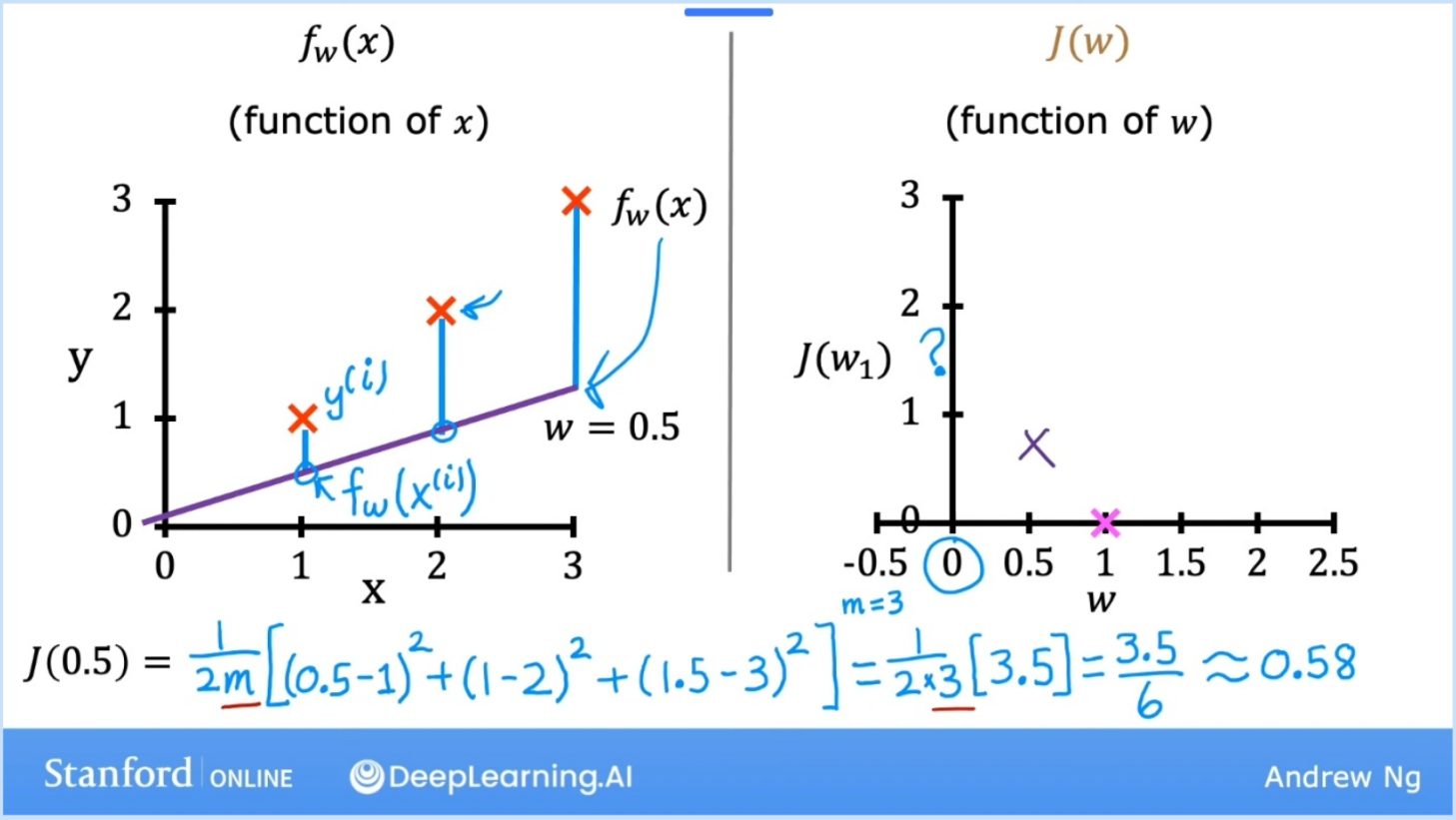


→ Now from the simplified function if we consider w=1 we get a line.

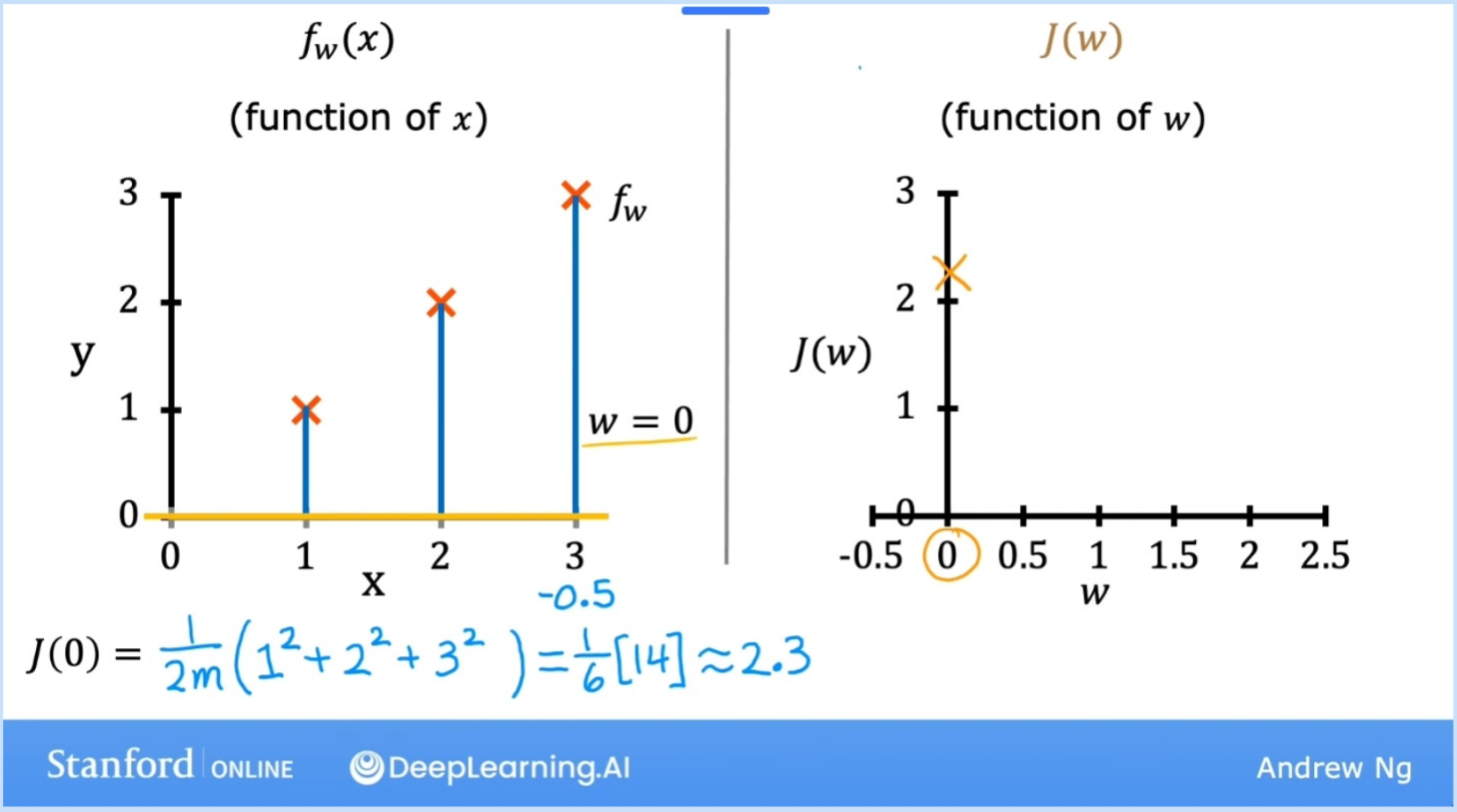
→ Now, for those 3 data we calculate J(w)

→ we get 0 from J(w) and Plot it to the graph

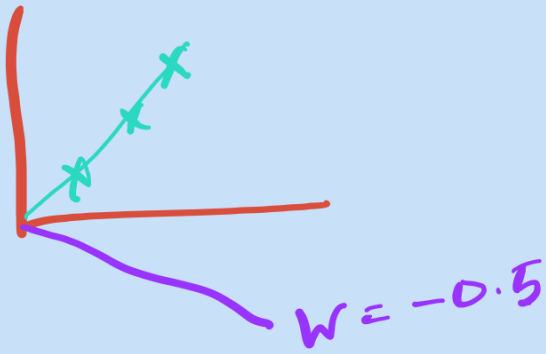
→ Now for W = 0.5



→ for $w = 0$



→ now if we go down and select w = negative values we will get something like this:

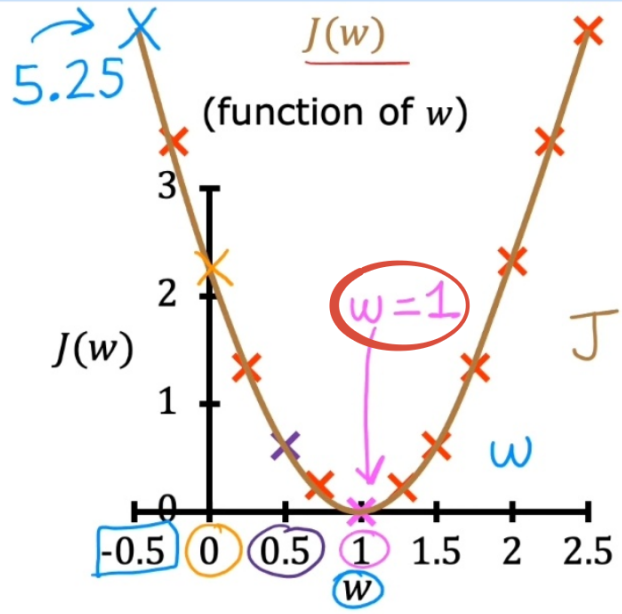


goal of linear regression:

$$\underset{w}{\text{minimize}}\, J(w)$$

general case:

$$\underset{w,b}{\text{minimize}}\, J(w,b)$$



choose w to minimize J(w)

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→ So, if we plot more w value we will get this graph

→ At last we will choose w that cause the J function minimum.