Machine Learning Worksheet 08

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Problem 1

$$\frac{\partial}{\partial w}\frac{1}{m}f(z_i - w \cdot x_i) + \frac{\lambda}{2} \mid\mid w \mid\mid^2$$
$$= \frac{1}{m}f'(z_i - w \cdot x_i) \cdot (-x_i) + \lambda w$$

where

$$f'(x) = \begin{cases} x & if \mid x \mid < 1 \\ 1 & if x >= 1 \\ -1 & if x <= -1 \end{cases}$$

Problem 2

Add the gradient to w, which is the direction that the function will approach minimum the fastest.

Problem 3

I think the code should look like this, with the two deltas initialized as 0, but somehow this does not yield the results I expect.
$l2\_delta = residual * self.out_transfer(l2, deriv = True) + momentum * l2\_delta$
$l1\_delta = l1\_error * self.hid_transfer(l1, deriv = True) + momentum * l1\_delta$