Deep Learning: Activation Functions

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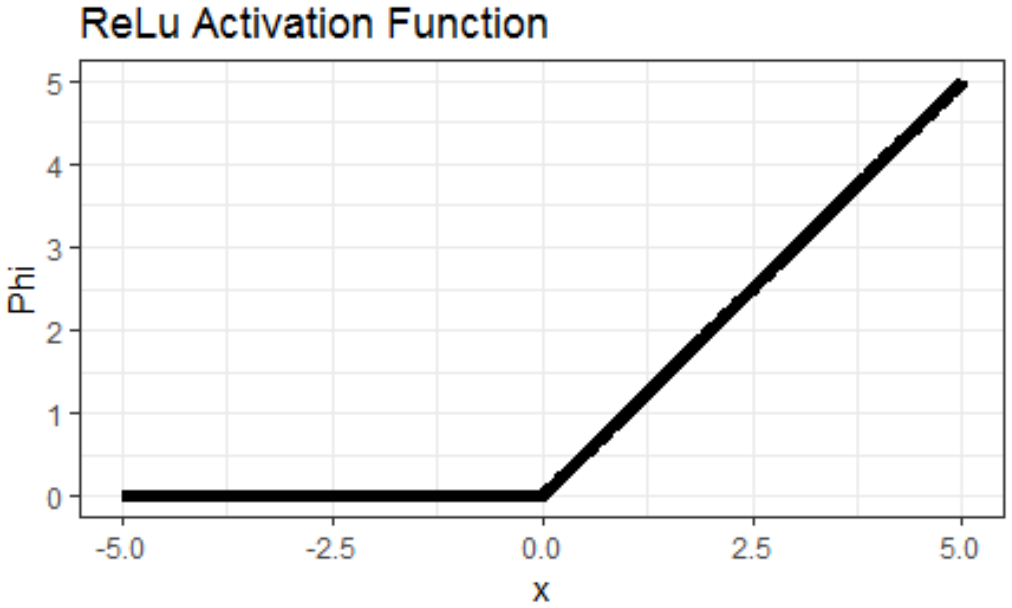
Deep Learning: Activation Functions

There are different activation functions.

Rectified Linear Unit (ReLu)

- Phi = max(0, x)
- Most common
- Non-linear

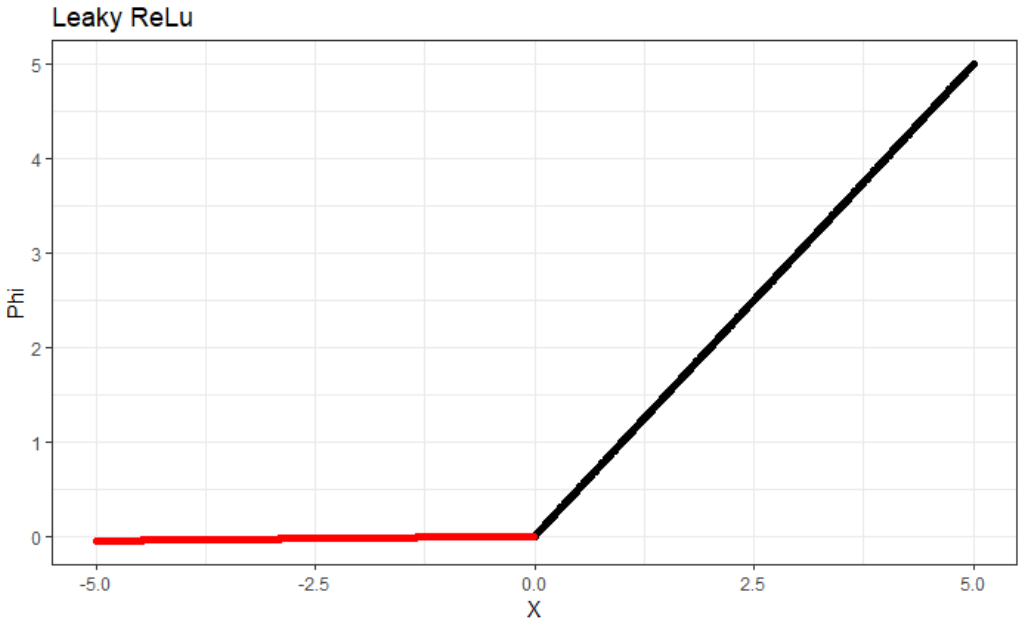


Deep Learning: Activation Functions

Leaky Rectified Linear Unit (Leaky ReLu)

- Phi(x) = { x if x>0 ; alpha * x otherwise }

- alpha typically 0.01
- Instead zero for negative inputs, small gradient
- Gradient never zero



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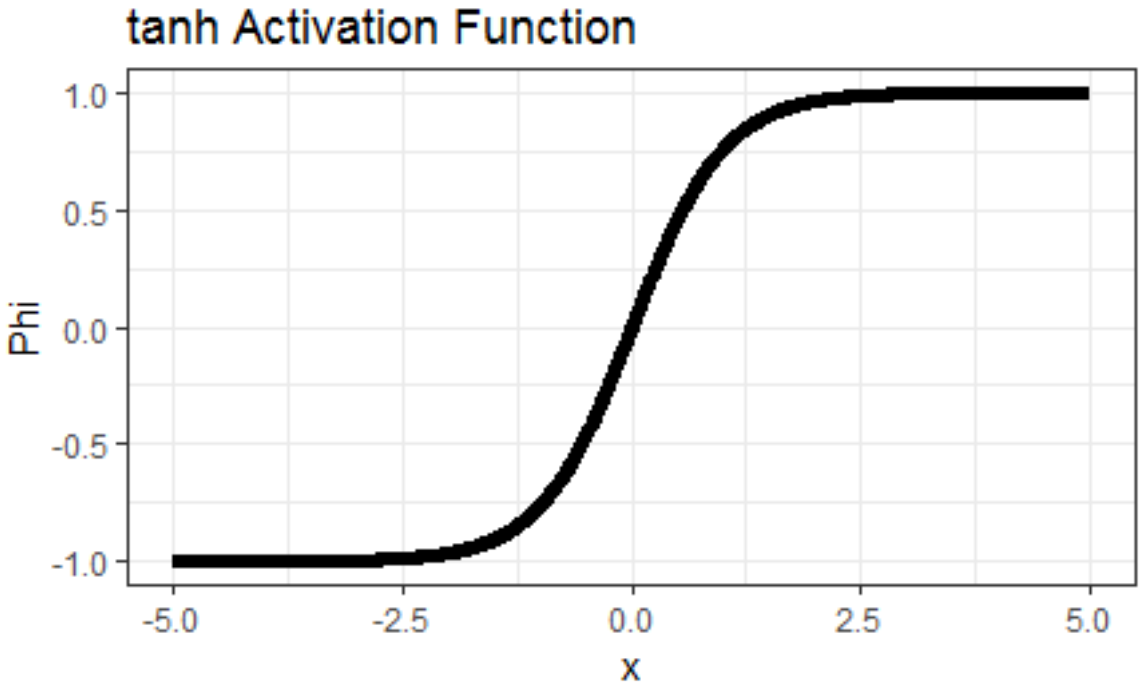
Hyperbolic Tangent (tanh)

- $\boldsymbol{Phi(x) = \frac{e^{x} - e^{-x}}{e^{x} + e^{-x}}}$

- Non-linear
- Relatively flat, except for small range
- Derivative small except for small range
- Might suffer vanishing gradient problem



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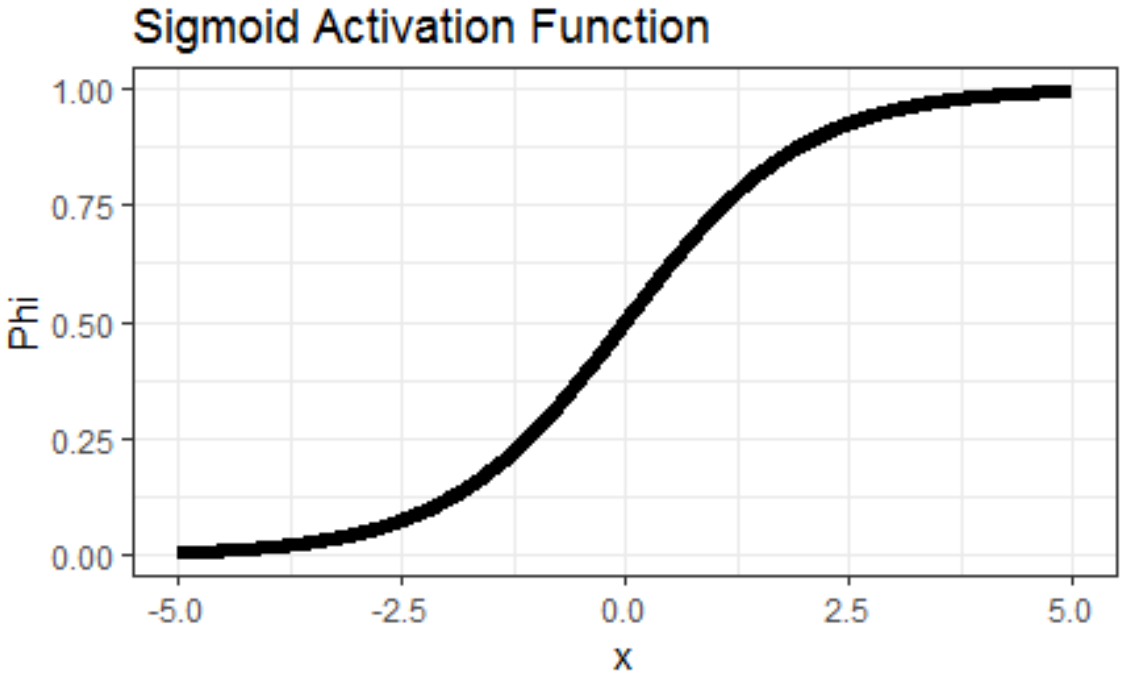
Sigmoid

- Phi(x) = 1 / (1+e^{-x})
- Non-linear
- Relatively flat, except for small range
- Derivative small except for small range
- Might suffer vanishing gradient problem
- Result range 0 to 1



Deep Learning: Activation Functions

Softmax

- Used for multi-class prediction