Nonlinear Activation Functions: Takeaways

Syntax

- ReLU function:

```
def relu(values):
 return np.maximum(x, 0)
```

- Tan function:
    - np.tan
- Tanh function:
    - np.tanh

Concepts

TRIGONOMETRIC FUNCTIONS

- Trigonometry is short for triangle geometry and provides formulas, frameworks, and mental models for reasoning about triangles. Triangles are used extensively in theoretical and applied mathematics, and build on mathematical work done over many centuries.
- A triangle is a polygon that has the following properties:
    - 3 edges
    - 3 vertices
    - angles between edges add up to 180 degrees
- Two main ways that triangles can be classified is by the internal angles or by the edge lengths.
- A trigonometric function is a function that inputs an angle value (usually represented as θ) and outputs some value. These functions compute ratios between the edge lengths.
- The three main trigonometric functions:
    - $\sin(\theta) = \frac{opposite}{hypotenuse}$
    - $\cos(\theta) = \frac{adjacent}{hypotenuse}$
    - $\tan(\theta) = \frac{opposite}{adjacent}$
- Right triangle terminology:
    - Hypotenuse describes the line that isn't touching the right angle.
    - Opposite refers to the line opposite the angle.
    - Adjacent refers to the line touching the angle that *isn't* the hypotenuse.
- In a neural network model, we're able massively expand the expressivity of the model by adding one or more layers, each with multiple linear combinations and nonlinear transformations.
- The three most commonly used activation functions in neural networks are:
    - the sigmoid function

- the ReLU function
- the tanh function

Resources

- Medium Post on Activation Functions
- Activation Function on Wikipedia
- Hyperbolic Tangent on Wikipedia
- Numpy documentation for tan
- Numpy documentation for tanh