Deep Feedforward Networks

Romeo Kienzler

Example

Part No.	Max Temp.	Min Temp.	Max Vibration	Asperity
100	35	35	12	0.32
101	46	35	21	0.34
130	56	46	3412	12.42
131	58	48	3542	13.43

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Quiz

Which column can be used to create a simple rule for this?

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100	35	35	12	0.32
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130	56	46	3412	12.42
131	58	48	3542	13.43

a3_m1_v2_deep_feedforward_neural_networks_ex1_1

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Machine Learning

$$y = w_0 + w_1 x_1 + w_2 x_2 + w_3 x_3$$

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a3_m1_v2_deep_feedforward_neural_networks_ex1_2

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Quiz

$$y = w_0 + w_1 x_1 + w_2 x_2 + w_3 x_3$$

Quiz

$$x_0 == 1$$

Quiz

$x_0 = 1$

$w * x$

Quiz

$$x_0 = 1$$

$$w * x = \begin{bmatrix} w_0 \\ w_1 \\ w_2 \\ w_3 \end{bmatrix} * \begin{bmatrix} 1 \\ x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

Quiz

$$x_0 = 1$$

$$w * x = \begin{bmatrix} w_0 \\ w_1 \\ w_2 \\ w_3 \end{bmatrix} * \begin{bmatrix} 1 \\ x_1 \\ x_2 \\ x_3 \end{bmatrix} = w_0 * 1 + w_1 x_1 + w_2 x_2 + w_3 x_3$$

Quiz

$$x_0 = 1$$

$$w * x = \begin{bmatrix} w_0 \\ w_1 \\ w_2 \\ w_3 \end{bmatrix} * \begin{bmatrix} 1 \\ x_1 \\ x_2 \\ x_3 \end{bmatrix} = w_0 * 1 + w_1 x_1 + w_2 x_2 + w_3 x_3 = y$$

Example

Part No.	Max Temp.	Min Temp.	Max Vibration	Asperity
100	35	35	12	0.32
101	46	35	21	0.34
130	56	46	3412	12.42
131	58	48	3542	13.43

Example

Part No.	Max Temp.	Min Temp.	Max Vibration	Broken
100	35	35	12	0
101	46	35	21	0
130	56	46	3412	1
131	58	48	3542	1

a3_m1_v2_deep_feedforward_neural_networks_ex1_3

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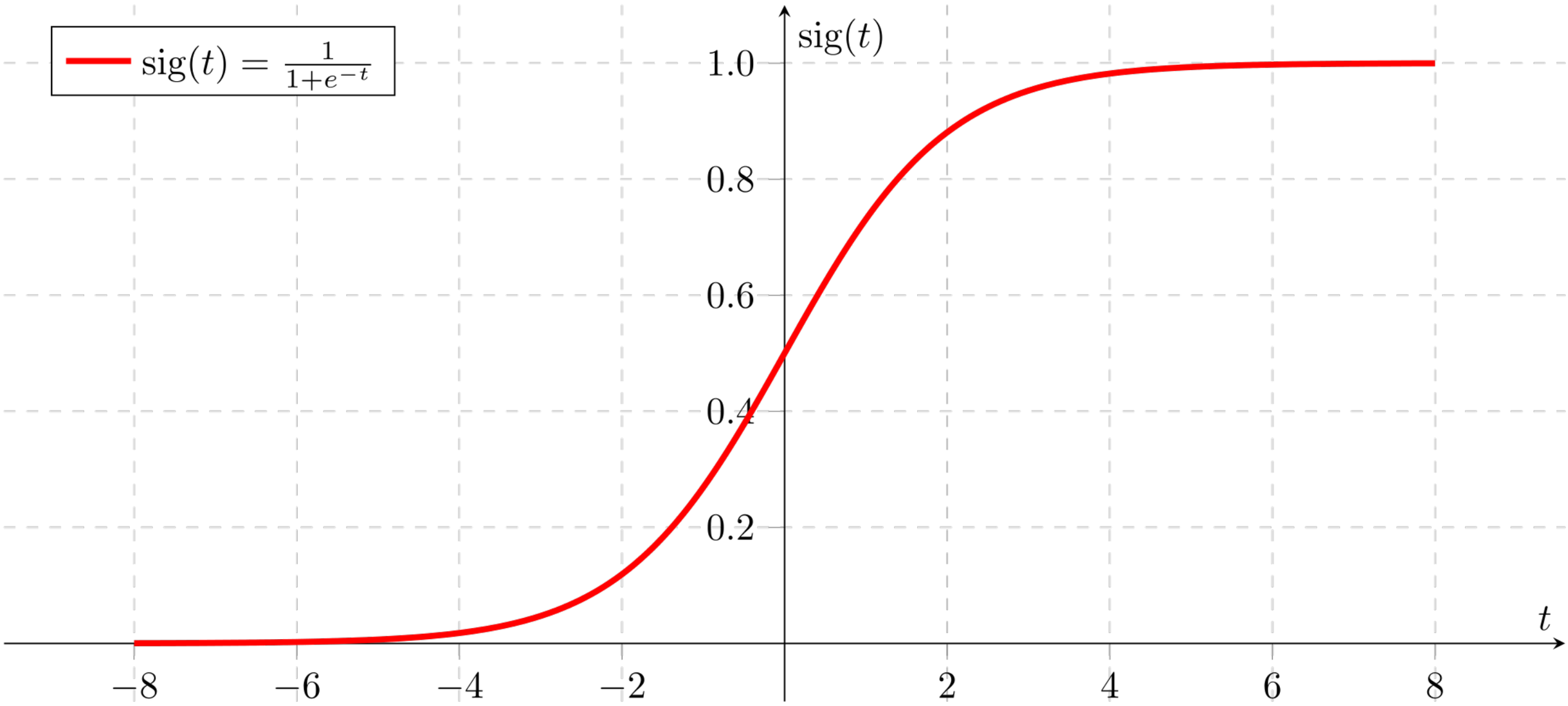
Sigmoid



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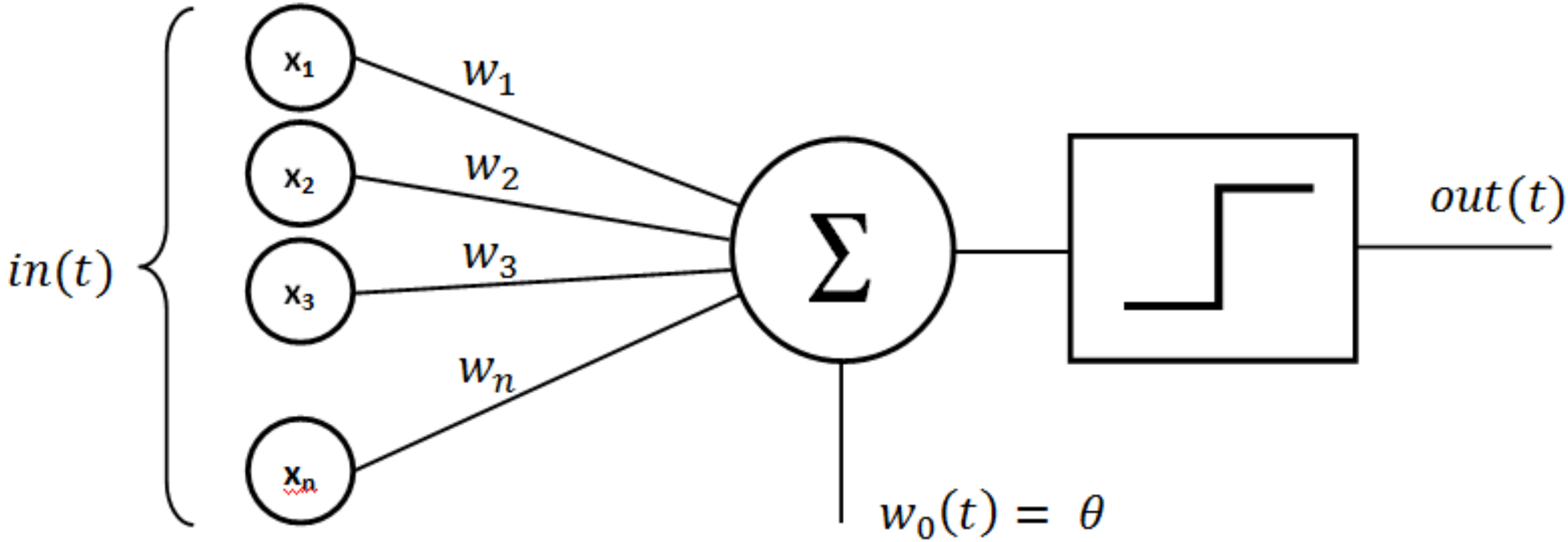
Logistic Regression

$$sigmoid(x) = \frac{1}{1+e^{-x}}$$

$$y = sigmoid(w_0 + w_1x_1 + w_2x_2 + w_3x_3)$$

Perceptron



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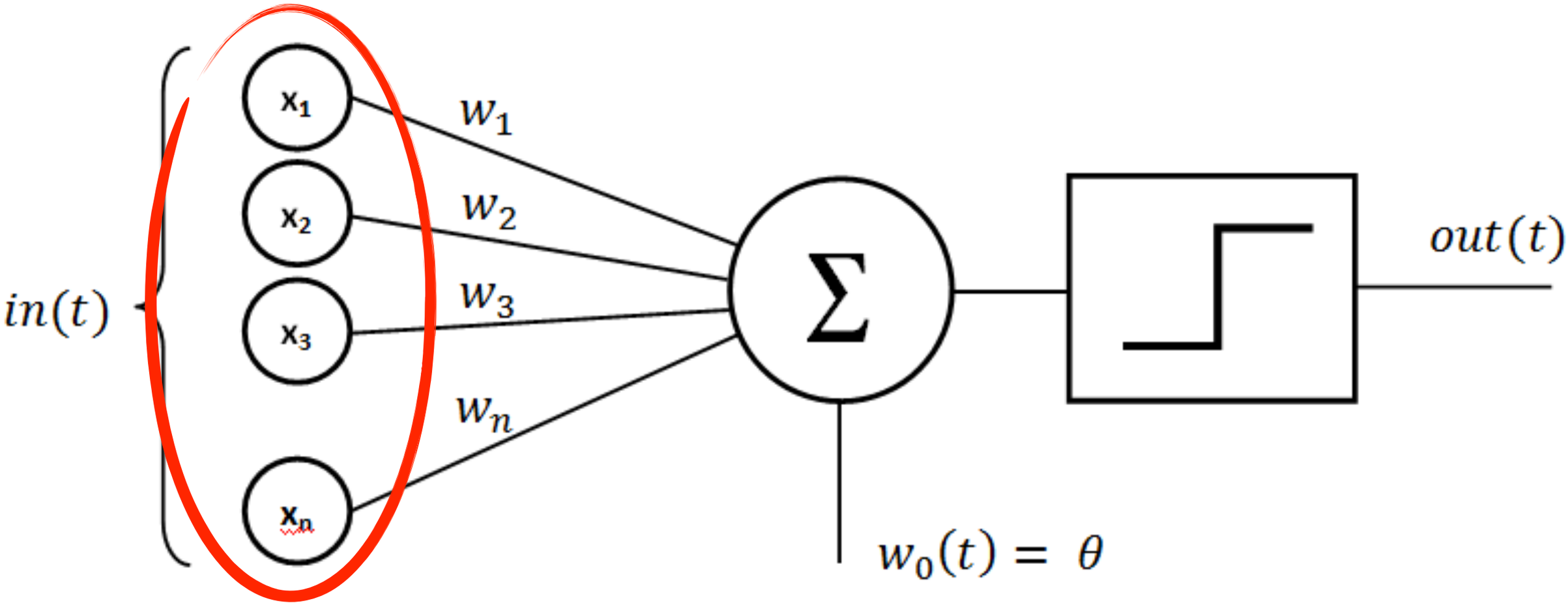
Perceptron



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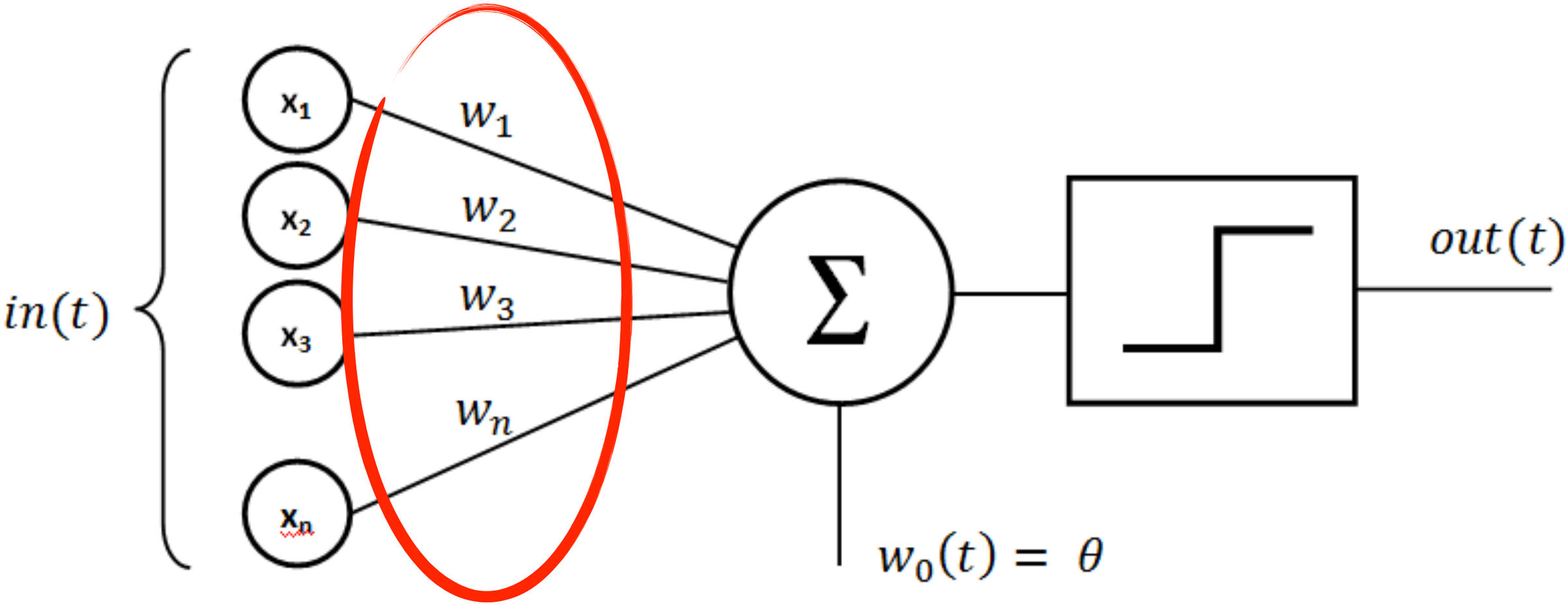
Perceptron



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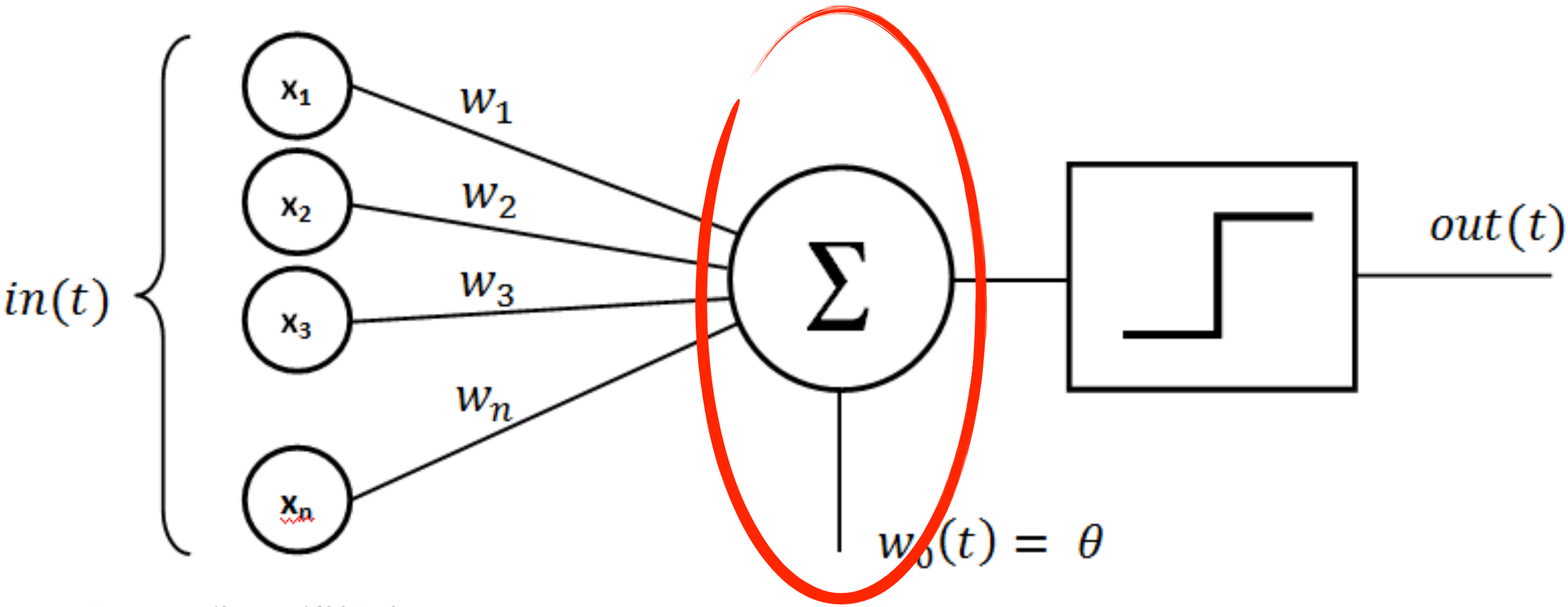
Perceptron



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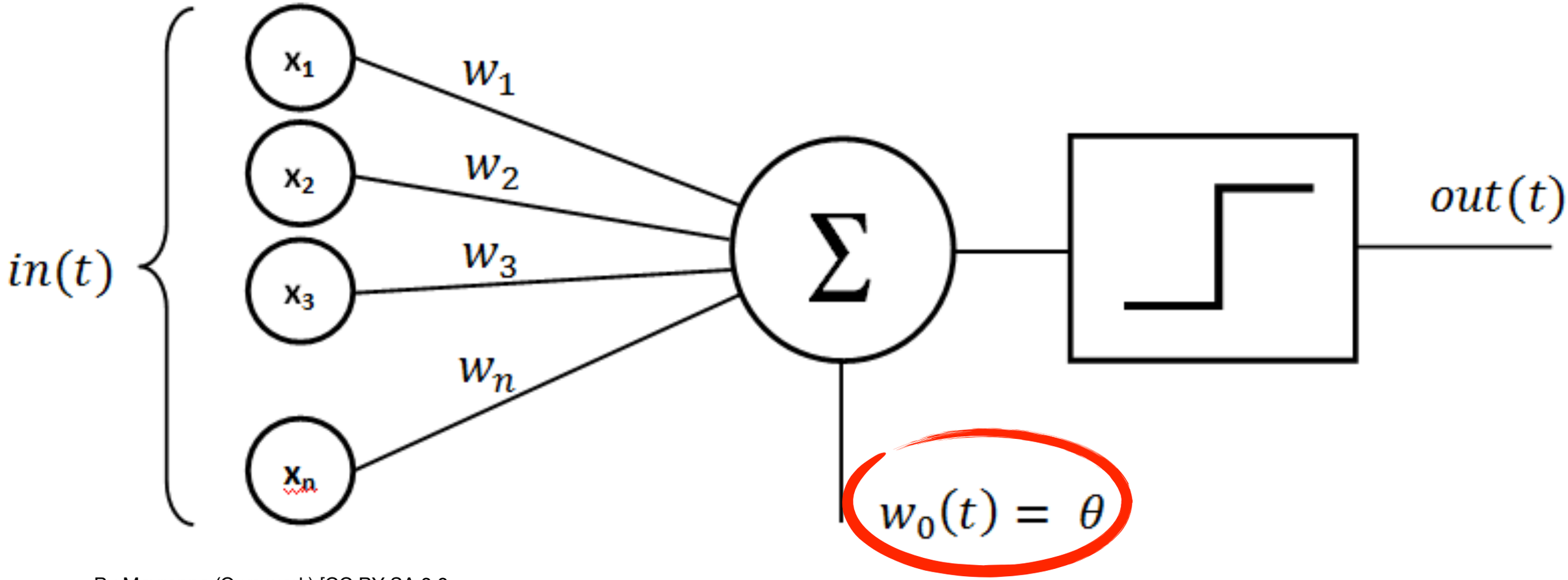

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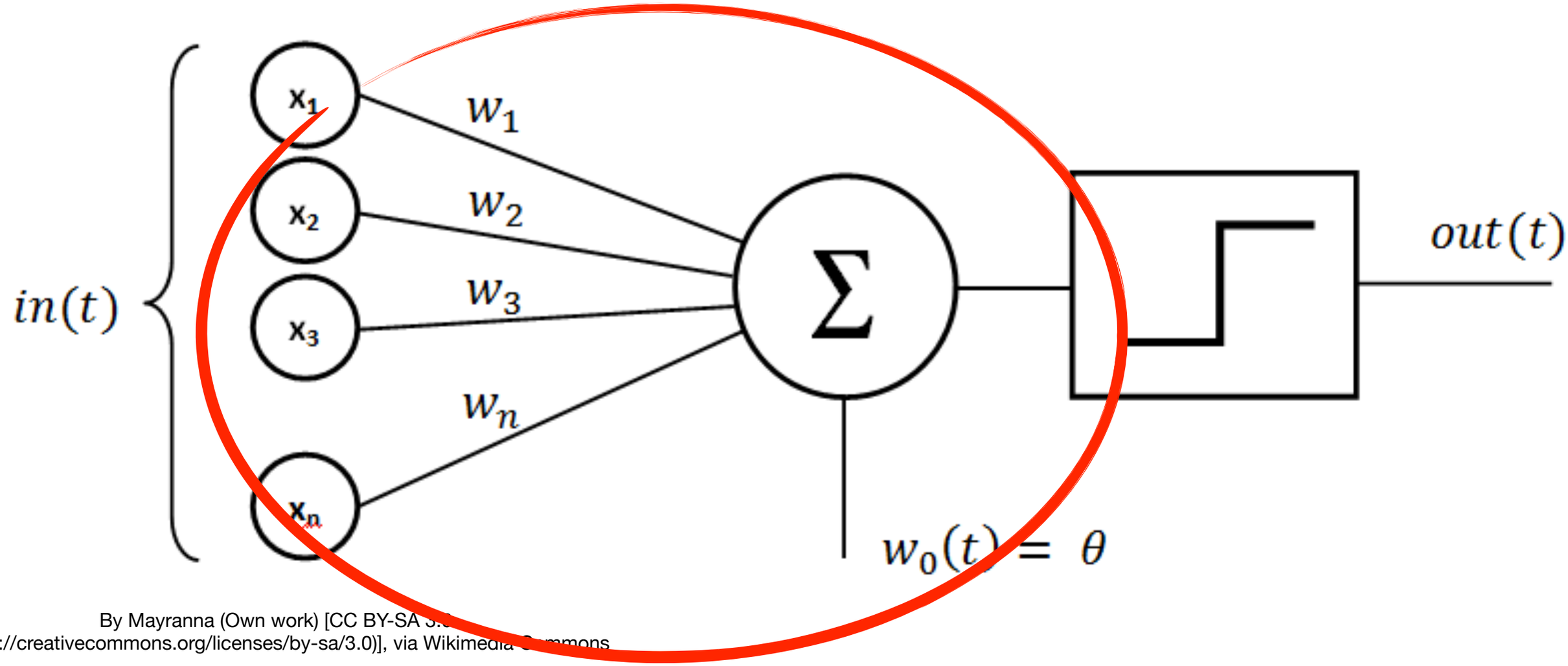

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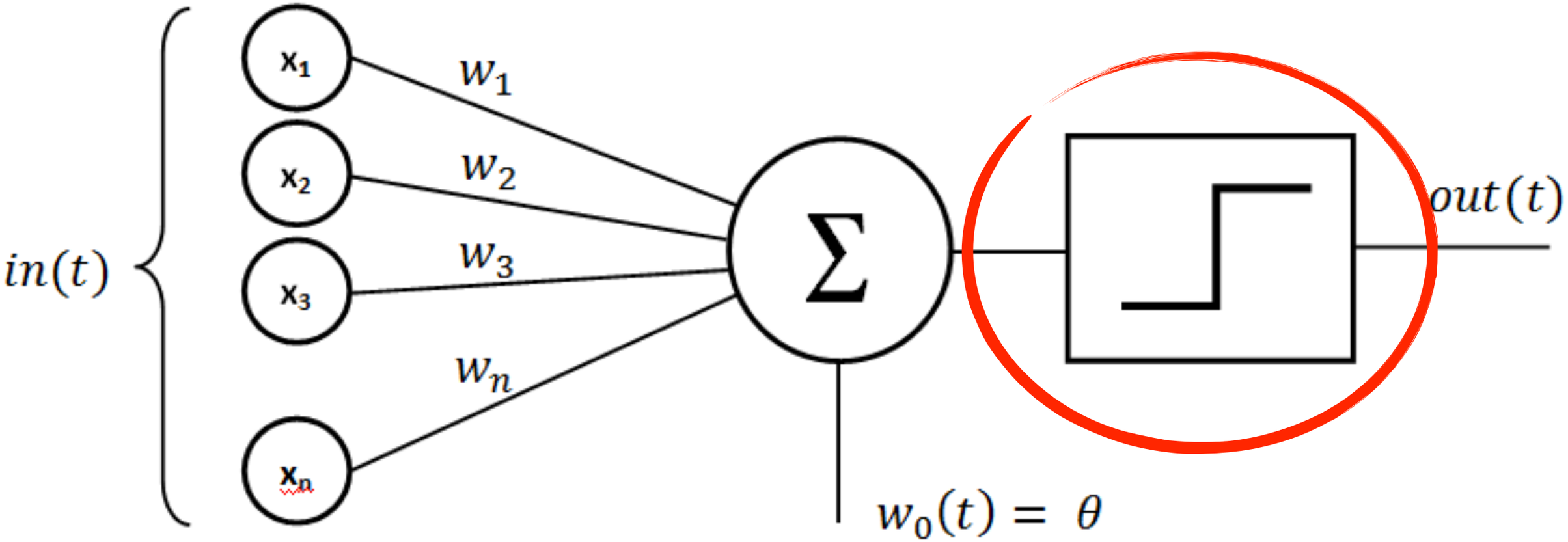

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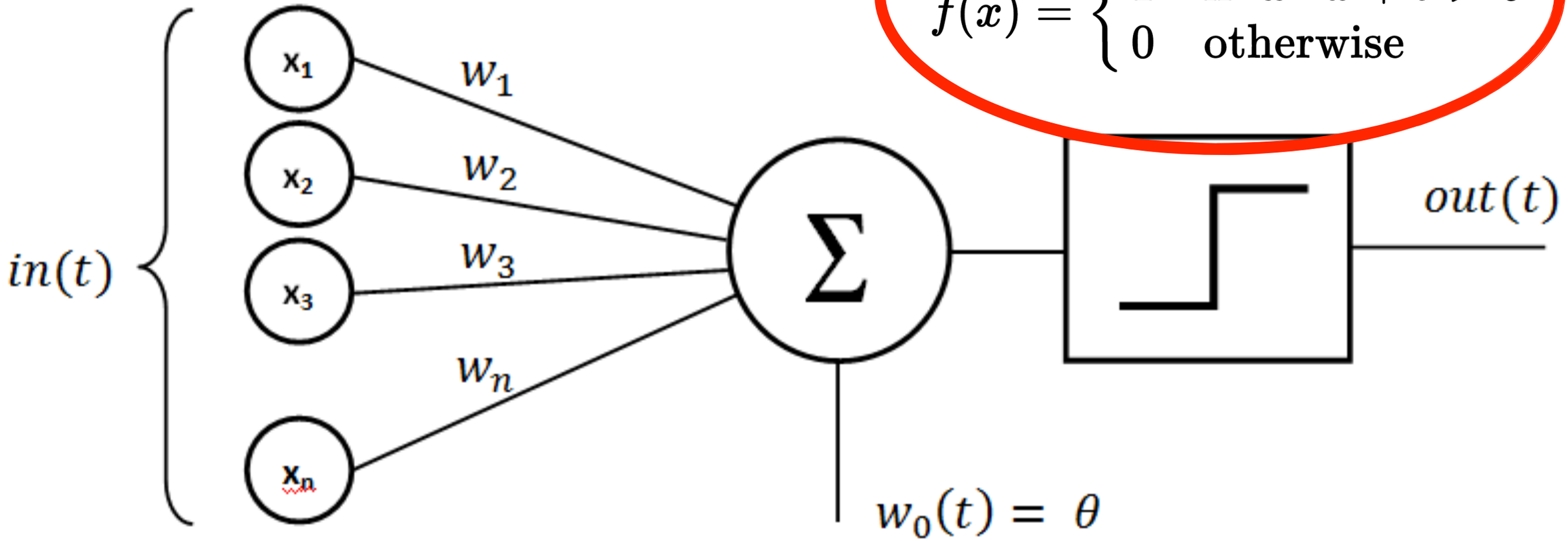
Perceptron

$$f(x) = \begin{cases} 1 & \text{if } w \cdot x + b > 0 \\ 0 & \text{otherwise} \end{cases}$$



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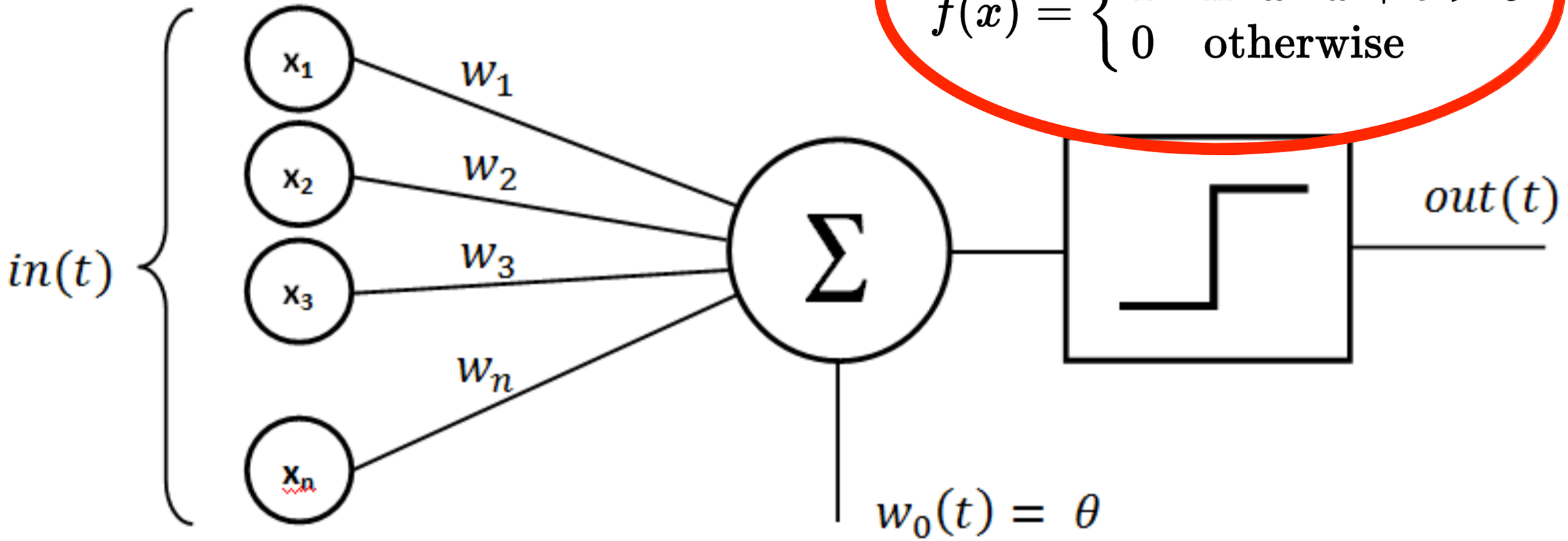

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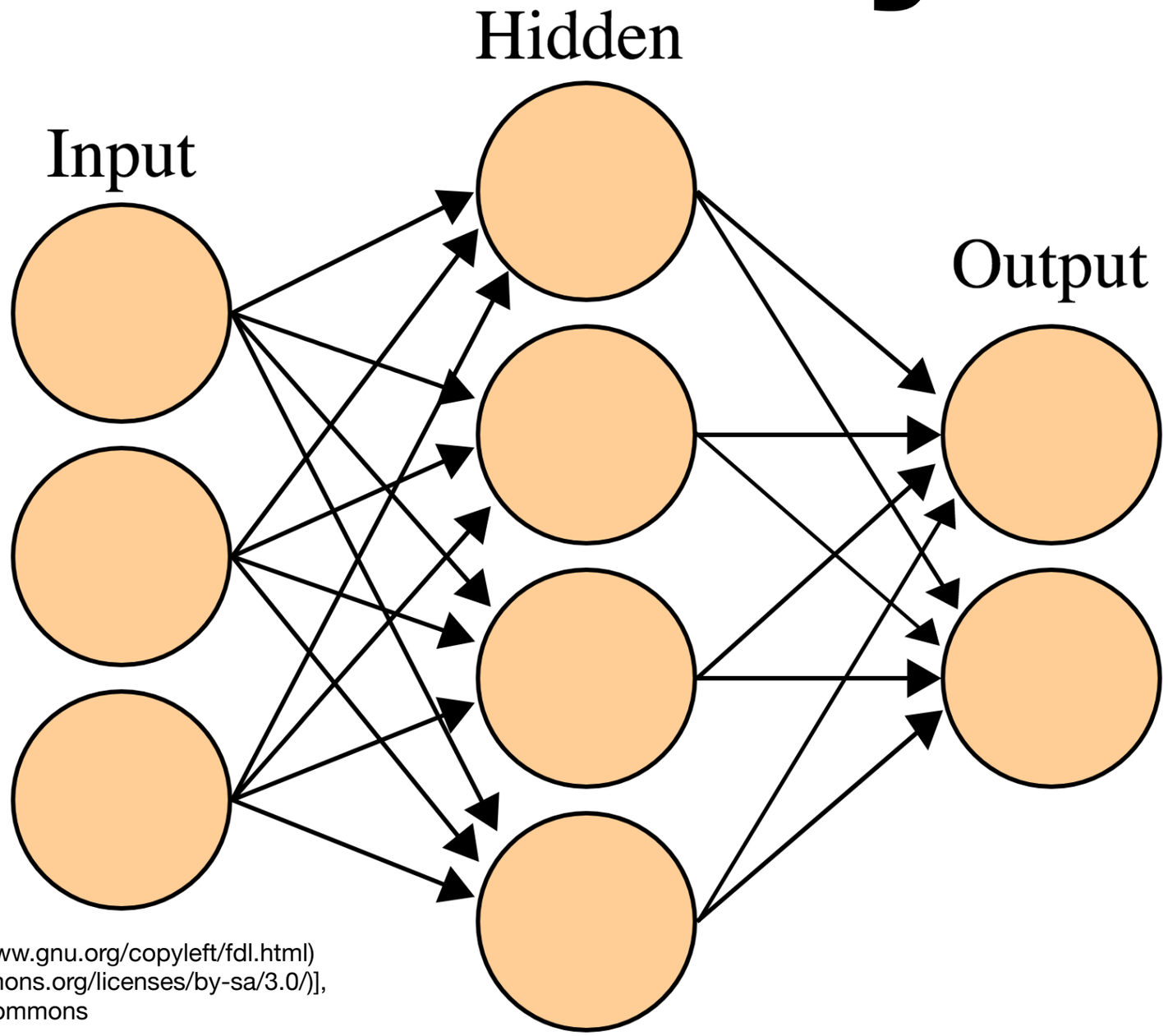
Hidden Layers



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a3_m1_v2_deep_feedforward_neural_networks_ex1_4a and b

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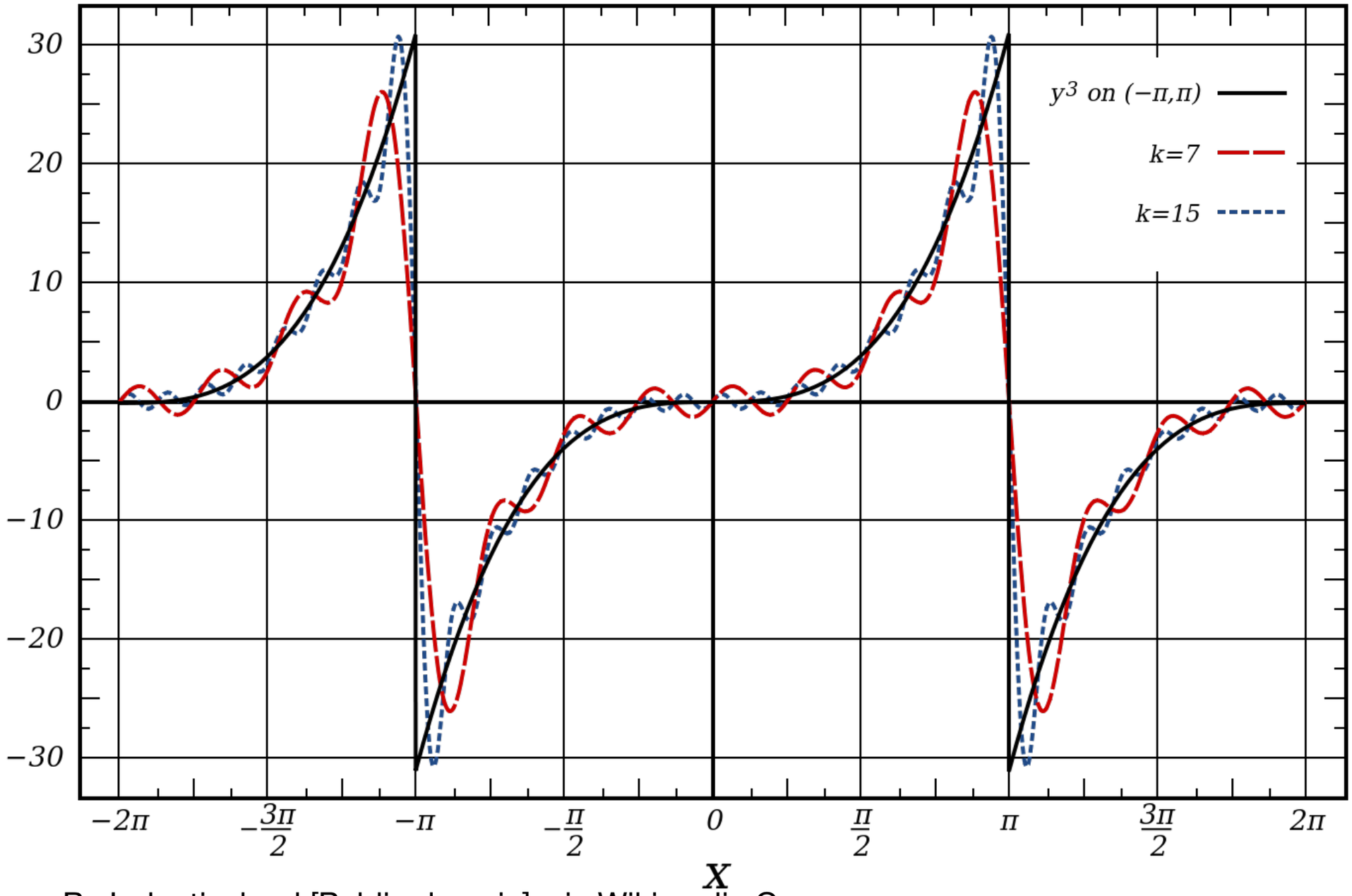

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Recurrent Neural Networks

Romeo Kienzler