

# XOR single-layer model theory

Max Cotton

## 1 Setup

- Where the weights  $W_{11}$ ,  $W_{12}$ ,  $W_{21}$  and  $W_{22}$  are together in an array  $W_1$ , as the hidden weights
- Weights  $W_3$  and  $W_4$  are together in array  $W_2$ , as the output weights
- $Z_{11}$  and  $Z_{12}$  are together in an array  $Z_1$ , and is the dot product of the  $W_1$  array and the input array, summed with a bias
- $A_1$  is  $\text{sigmoid}(Z_1)$
- $Z_2$  is the dot product of the  $W_2$  array and  $A_1$ , summed with a bias
- $A_2$  is  $\text{sigmoid}(Z_2)$ , which is the prediction  $Y$

## 2 Forward Propagation

## 3 Back Propagation