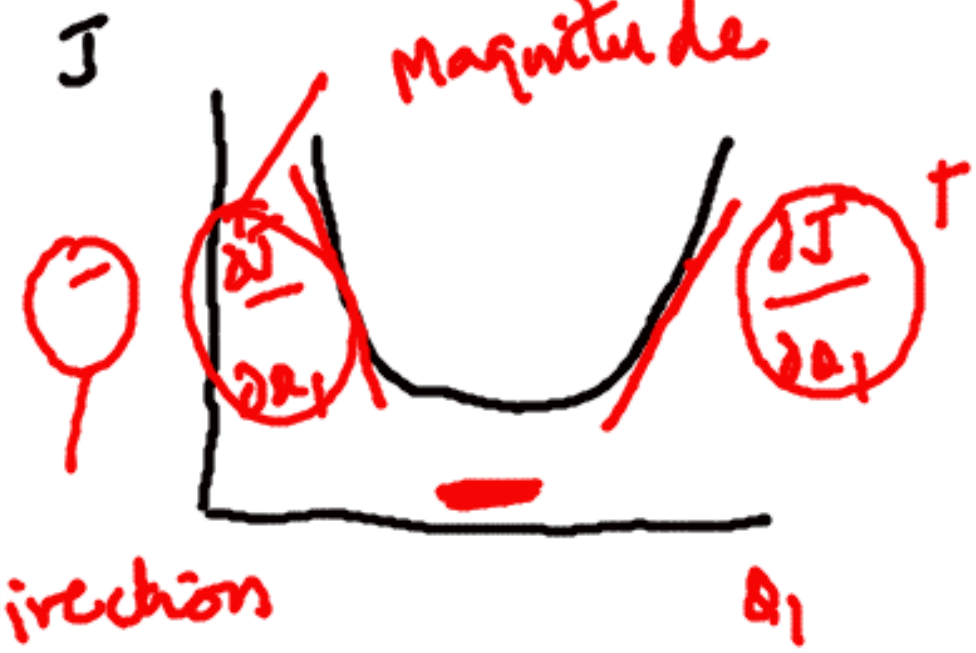
Gradient Descent Math

$$\text{Error} = \frac{1}{2}(y - \hat{y})^2$$

$$\hat{y} = f(a_1, a_2 \cdots)$$

$$\hat{y} = 3a_1 + 4a_2$$

$$\hat{y} = f(a_1)$$



$$\text{update} \Rightarrow a_1 = a_1 - \left(\frac{\partial J}{\partial a_1}\right)^{+}$$

+ a_1 decreases

− a_1 increases

Gradient Descent Neural Network:

$$\hat{y} = f(w_{ih_1}, w_{h_1h_2}, w_{h_2o})$$

$$J = \frac{(y - \hat{y})^2}{2}$$

$$\frac{\partial J}{\partial w_{h_2o}}, \quad \frac{\partial J}{\partial w_{h_1h_2}}, \quad \frac{\partial J}{\partial w_{ih}}$$

$$w_{h_2o} = w_{h_2o} - \eta \cdot \frac{\partial J}{\partial w_{h_2o}}$$

$$w_{h_1h_2} = w_{h_1h_2} - \eta \cdot \frac{\partial J}{\partial w_{h_1h_2}}$$

$$w_{ih} = w_{ih} - \eta \frac{\partial J}{\partial w_{ih}}$$

} Stopping criteria

Thank You