

Quiz 3 Cheat Sheet

$$\nabla f = \frac{\partial f}{\partial \alpha_1} e_1 + \frac{\partial f}{\partial \alpha_2} e_2 + \dots + \frac{\partial f}{\partial \alpha_d} e_d$$

$\nabla f: \mathbb{R}^d \rightarrow \mathbb{R}^d$ & $f: \mathbb{R}^d \rightarrow \mathbb{R}$

$$\nabla_u f(\alpha) = \langle \nabla f(\alpha), u \rangle$$

Goal: $\min_{\alpha \in \mathbb{R}^d} f(\alpha)$ and/or $\alpha^* = \operatorname{argmin}_{\alpha \in \mathbb{R}^d} f(\alpha)$

0: Initialize $\alpha^{(0)} = \alpha_{\text{start}} \in \mathbb{R}^d$, $k = 0$

1: Repeat $\alpha^{(k+1)} = \alpha^{(k)} - \gamma_k \nabla f(\alpha^{(k)})$, $k = k+1$

until: $\|\nabla f(\alpha^{(k)})\| \leq \tau$ or $k = T$

2: Return $\alpha^{(k)}$