

# Optimization - Minitest 3

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## Question 1

$$\mathbb{E}_{\xi_k} [F(w_{k+1})] - F(w_k) \leq \alpha_k \left( \mu - \frac{1}{2} \alpha_k L M_G \right) \|\nabla F(w_k)\|^2 + \frac{1}{2} \alpha_k^2 L M \quad (1)$$

**What does equation (1) imply ?** If  $\alpha_k$  is small enough,  $\mathbb{E} [F(w_{k+1})] \leq F(w_k)$ , so we can hope that the gradient method leads to the minimum of  $F$ .

## Question 2

**What is the role of each of the components  $(\alpha_k, L, M, \dots)$ ?**