Step size selection for gradient descent

- Constant step size: $\alpha_k = c \in (0, 1)$;

  Note that this approach won't guarantee convergence.

- Diminishing stepsize: $\alpha_k > 0$, $\alpha_k \to 0$, $\sum_{k=1}^{+\infty} \alpha_k = +\infty$, for example $\alpha_k = \frac{1}{k}$, for $k > 0$.

- Exact line search:

$$\alpha_k = \arg\min_{\alpha \geq 0} f(x_k + \alpha s_k).$$

- Limited minimization:

$$\alpha_k = \arg\min_{\alpha \in [0,1]} f(x_k + \alpha s_k).$$