

$$x_{k+1}^{(i)} \quad := \, x_k^{(i)} + \alpha(-O(f_k, \mathbf{x}_k, \mathcal{N}^{(i)})) \quad = \, x_{\textcolor{blue}{k}}^{(i)} - \alpha(\nabla f_k(x_k^{(i)}) + \varepsilon_k),$$