Although $\Delta f(\mathbf{u}) > 0$ as long as $f(\mathbf{u}) < f^*$, $f^{(k)}$ does not necessarily converge to f^* because the increment in $f^{(k)}$ in each step may be arbitrarily small.

Theorem 9.5 If f is concave, then $f^{(k)} \to f^*$.