Notes on NEWUOA

Zaikun Zhang *

June 6, 2021 3pm

Algorithm 0.1 labelalg:newuoa

Input: $x_0 \in \mathbb{R}^n$, $\Delta_0 \in (0, +\infty)$, $m \in \{n+2, n+3, \ldots, (n+1)(n+2)/2\}$.

1. **Initialize**. Choose $\mathcal{X}_0 \subset \mathbb{R}^n$ such that $x_0 \in \mathcal{X}_0$ and $|\mathcal{X}_0| = m$. Set $x_0^* = \operatorname{argmin}\{f(x) : x \in \mathcal{X}_0\}$, $Q_0 = \operatorname{argmin}\{\|\nabla^2 Q\|_{\mathrm{F}} : Q \in \mathcal{Q}, Q(x) = f(x) \text{ for } x \in \mathcal{X}_0\}$.

*Hong Kong Polytechnic University, zaikun.zhang@polyu.edu.hk