

Input x

First time?

No

Among all saved inputs $\mathcal{I} = \{x^i\}_{i=1}^I$
find x^* closest to x

Retrieve the corresponding $\left(x^*, y^*, \text{ and } \frac{\partial f^*}{\partial x}\right)$

Estimate x using:
$$\bar{y} = y^* + \frac{\partial f^*}{\partial x} (x - x^*)$$

Does estimated \bar{y} pass the acceptance test
 $|\bar{y} - y^*| \leq \epsilon_{\text{rel}} |y^*| + \epsilon_{\text{abs}} ?$

No

Calculate y using:
 $y = f(x)$

Calculate the sensitivity $\frac{\partial f}{\partial x}$

Save $\left(x, y, \text{ and } \frac{\partial f}{\partial x}\right)$

Yes

Finish