What do we mean by
good algorithm performance?

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Problem Family × Algorithm Family

Performance is for a particular algorithm working on a particular problem.

In practice, the next problem is not known, so we are interested in average performance across the problem class.

But what probabilility measure to use?

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Problems: Examples

Problem Statement:
Find a zero of the vector function $g : \mathbb{R}^q \to \mathbb{R}^q$, given only a consistent estimator G_m of g, where m is some measure of effort.

Problem Statement:
Find a minimizer of the vector function $g : \mathbb{R}^q \to \mathbb{R}^1$, given only a consistent estimator G_m of g, where m is some measure of effort.

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What is given? What is to be found?

Precision required? In x or y space?

Objective function: What is known to the algorithm?

Constraints: What is known to the algorithm?

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1. Expected solution quality as a function of computing effort

2. Size of the problem class

3. Required parameter tuning

4. Convergence proof(s)

5. Quality of reported precision

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