

Analysis and Design Document
for
OPAL

January 15, 2010

Chapter 1

Introduction

The primary goal is create a framework that helps the users to realize the tuning task following the schema

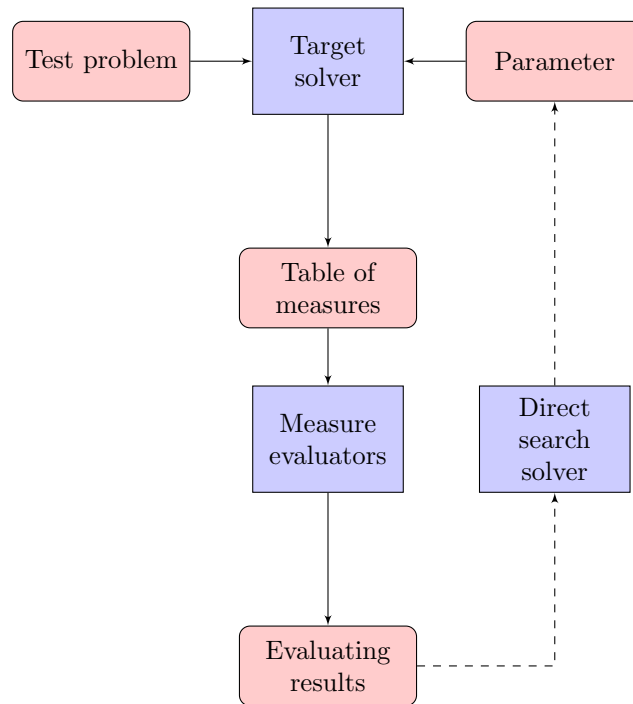


Figure 1.1: General schema of parameter tuning

Chapter 2

Backgrounds

The principles are built basing on the observations:

- There are main entities Information and Information Manipulator
 1. Information is in fact set of elements with the methods set and get value. The set is organized in the different structure like a scalar, a vector or a matrix ...
 2. Information Manipulator represent for the processes manipulate the input information to get the other information as output
- Other the set and get methods for each element, the Information may be combined by the set operation like union, extract, subset vrfication.
- An Information Manipulator is characterized by Input, Parameters and Output.
 1. Input includes the Information and set of Manipulators that may be a empty set. If this set is empty, the Manipulator is called Evaluator, otherwise it is called Solver.
 2. Parameter is actually Information, it is used to generallized a class of Manipulator. Each time the parameters are set to the specific values, we have a manipulator.
 3. Output is Information represents for the results of manipulation.
- Any process is formulated by the combinations of the manipulators
 1. Sequence of evaluator: Output of the first evaluator is input of the second evaluator
 2. Support: A solver may be used the other evaluator during processing Information
 3. Cooperation: Two manipulator have the same Input.

- The relations amongs Manipulators are:
 1. Dependence: A manipulator depends on the others if it used the others to proccess the Information
 2. Composite: A manipulator can be decomposed as combinations of the others

Chapter 3

System analysis

We apply the principle above to describe the framework in a typical use-case.

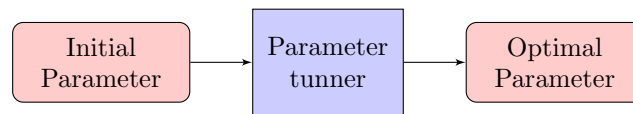


Figure 3.1: Top view of tuning parameter

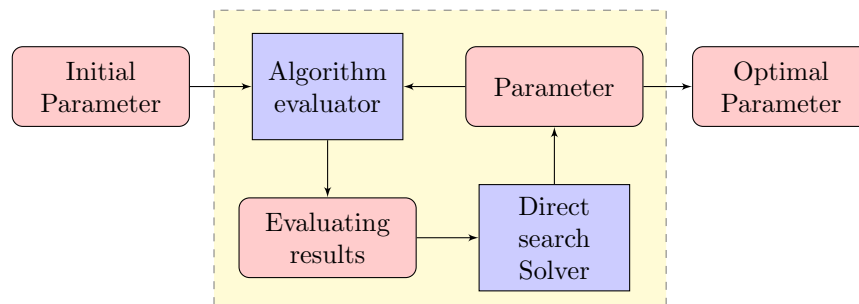


Figure 3.2: Black box optimization view of tuning parameter

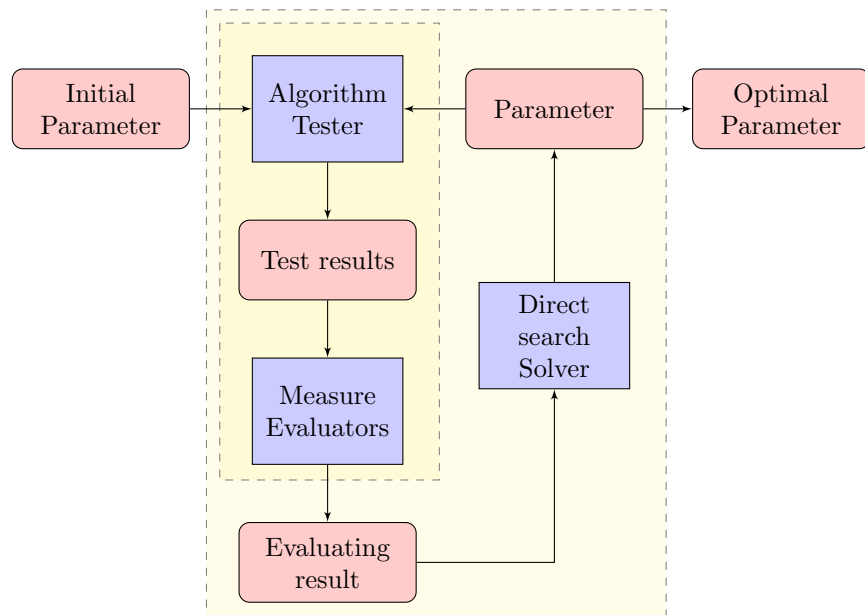


Figure 3.3: Empirical test view of tuning parameter

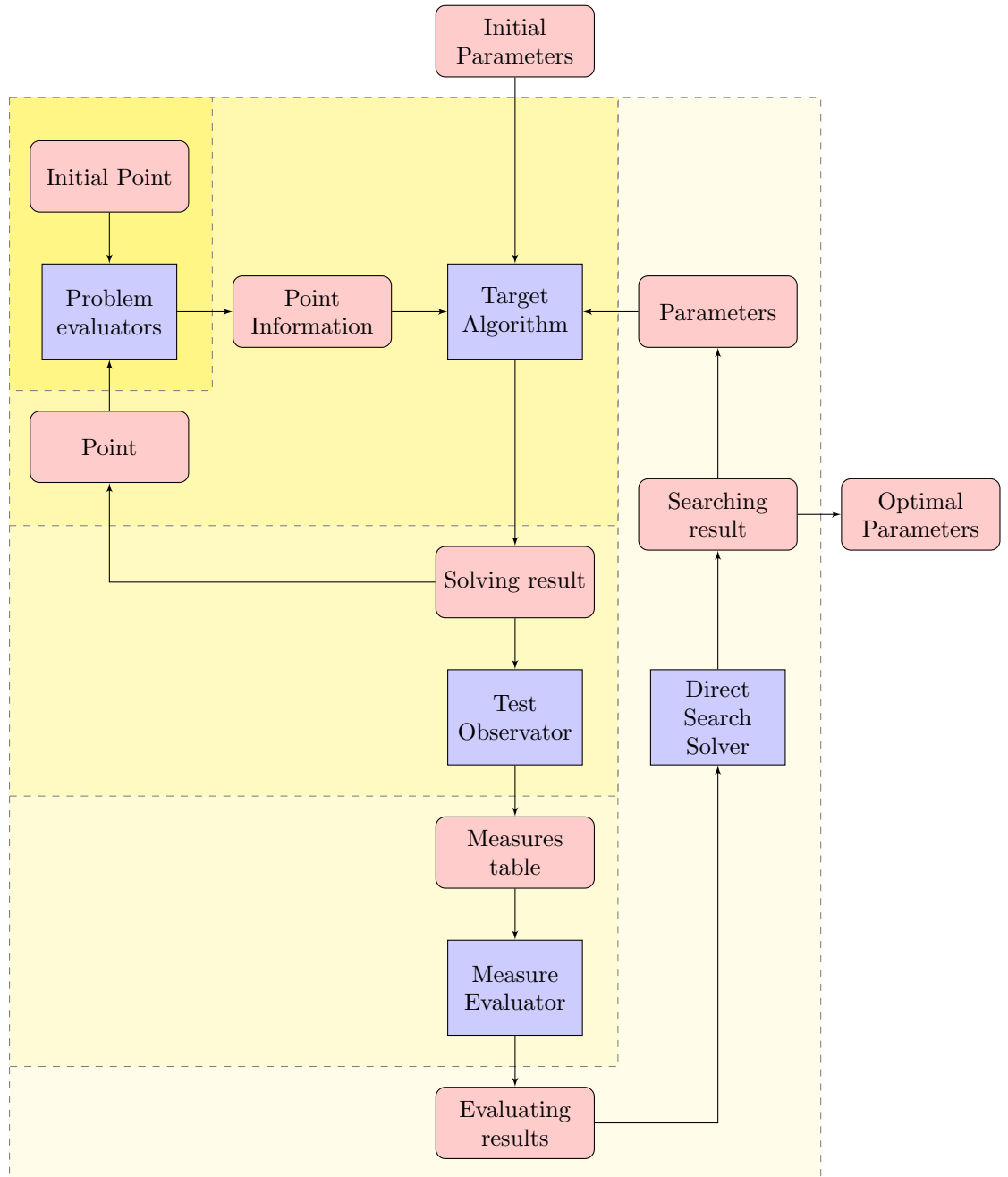


Figure 3.4: Algorithm view

Chapter 4

System design