

Exercise 2: From Simple Texts to Analytical Descriptions

Summer Term 2024

This exercise should help you derive an analytical problem formulation from a plain and potentially vague text description.

Review: What are the necessary “ingredients” of an optimization task?

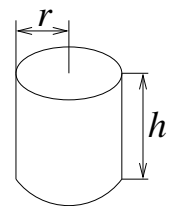
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To Do: For every single task, you should discuss the following questions:

1. What is the optimization goal?
2. What are the parameters x_i to be optimized?
3. What is a suitable fitness formulation?
4. Does only one good fitness formulation exist or do you have several choices?

Applications: Please consider the following applications:

1. Assume that you have a ball-throwing catapult. The throwing speed v is constant and cannot be changed. How can you hit a target at distance d ? Then, assume that you can adapt the throwing speed v . How can hit the ball the target at distance d with the minimal speed v possible?
2. A *cylindric* bucket with one bottom and no top is needed that has a pre-specified volume. The goal is to determine both the bucket’s diameter and its height such that the bucket’s surface is minimal.
3. You have a fence of 500 meters in length with which you are supposed to surround a rectangular area as large as possible.



Have fun, Theo and Ralf.