# Critical review
Hybrid optimization methods

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Communication skills 1
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Abstract

Genetic algorithms are optimization methods based on the Darwin's theory of the evolution of the species. This evolution is managed by genetic information compound only by the information of individual evaluations of the function of interest. This is one of the main drawbacks when comparing with Gradient-based methods. In order to overcome this issue, hybrid methods increase the genetic information defining several populations in parallel. These populations can be defined using the same parameters, or can be different. The present presentation explore the benefits of defining population from pretty similar, just slightly modifying few parameters, to completely different, using a completely new set-up. Applications to transport simulation, or CFD optimization will be presented to illustrate the results.
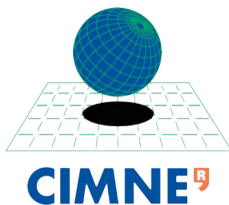
1 Review

In this seminar, Jordi Pons presents several methods of optimization, one especially called "genetic method", not deterministic, based on biomimicry and population behavior. The seminar begins with an introduction showing the structure of the presentation. Then a short review on optimization and some examples of practical applications are explained. Then the main methods are presented, the direct methods and evolutionary methods. Some practical examples are shown and the results are discussed.

2 Positive points

The English is understandable, articulated and loud enough. It was easy to understand him and I felt like he spoke to the whole audience. He looked comfortable in front of the public.

What I appreciated is the highlighted objectives and practical applications. This makes the public understand straight what are the objectives, which makes the further explanations intelligible. Also, the structure announced in the intro is really useful to follow the thread. Time dedicated per section and slides was uniformly distributed, and the mentionned examples interesting. Especially the (M6 wing reconstruction) is shown, which is interesting.

Explanation on each method and its limits were well explained, Implementation details (languages used, etc) are interesting to me.

3 What may be improved

Some slides are too overloaded. It's difficult to read, understand and listen in the same time. Some illustrations could be used to attract the attention. Some acronyms are used and looks unclear for the non specialists.

One graph was too dark and not readable, and only had acronyms which is not understandable.

The voice was quite monotone, it would have been interesting to interact with the public to attract attention.

The part comparing population to a physical problem illustrating the Genetic algorithm should be illustrated to make it understandable. It's hard to get a new concept without images. Even more for a international public. An trivial optimization problem solved with a genetic method explained point per point would be interesting to understand better.

An implementation complexity comparison would have been interesting to know between classic methods and genetic methods.

4 Personal point of view

This seminar was really interesting to me as I had to face optimization problems in the past, and evolutionary algorithms were totally unknown to me. I learned interesting methods and grab some references I could use in the future. Sadly no questions were asked.