

How to choose the appropriate Object-Oriented framework

Observations made while implementing desiRe

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The talk will focus on some of the challenges faced during the development of the desiRe package. Desirability functions and desirability indices are powerful tools for multicriteria optimization und multicriteria quality control purposes. The package desiRe not only provides functions for computing desirability functions of Harrington- (Harrington, 1965) and Derringer/Suich-type (Derringer and Suich, 1980) but also allows the specification of the functions in an interactive way. Density and distribution functions of the desirability functions and the desirability index are integrated including the possibility of random number generation (Steuer, 2005), (Trautmann and Weihs, 2006). Optimization procedures for the desirability index and a method for determining the uncertainty of the optimum influence factor levels (Trautmann and Weihs, 2004) as wells as a control chart for the desirability index with analysis of out-of control-signals are implemented (Trautmann, 2004). The Desirability Pareto-Concept allows focussing on relevant parts of the Pareto-front by integrating a-priori-expert-knowledge in the multicriteria optimization process (Mehnen et al., 2007).

One of the challenges faced when developing a new package is which implementation of object orientation to use. The S language and its implementation R provide two very different approaches. S3 methods are a straight forward implementation, where method dispatch done based on the class of one of the arguments. This is both fast and easy to implement. On the other hand, S4 provides a powerful method dispatch system and much nicer data encapsulation with pre- and postconditions as well as a certain degree of type safety. Some of the aspects we will cover in the talk include ease of implementation, the speed of method invocation and how these systems deal with functions as first class objects. Especially the last aspect will be dealt with, since function objects are a natural way to represent a desirability.

The last part of the talk will focus on ways to improve the speed of critical functions by rewriting them in C(++) .

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