

# Optimal designs for models with potential censoring

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## Abstract

This presentation deals with optimal design theory for models with potential censoring either on independent or dependent variables. On the one hand optimal approximate designs when an independent variable might be censored are considered. The problem is which design should be applied to obtain an optimal approximate design when the censored distribution function is assumed known in advance. The approach for finite and continuous design spaces deserves different attention. In both cases equivalent theorems and algorithms are provided in order to calculate optimal designs. Some examples illustrate this approach for D–optimality.

On the other hand a development of the optimal design theory is carried out for a particular Cox Regression problem. The failure time is modeled according to a probability distribution depending on some explanatory variables through a linear model. At the end of the study some units will have not failed and thus their time records will be censored. In order to deal with this problem from an experimental design point of view it will be necessary to assume a probability distribution of the time of debut of an experimental unit in the study. Then an optimal conditional design will be computed at the beginning of the study for any possible given time of debut. Thus, every time a new unit enters the study there is an experimental design to be applied. A particular and simple case is used throughout the presentation in order to illustrate the procedure.

**keywords:** Censoring distribution, D–optimality, Information Matrix, Marginally restricted designs, Survival analysis.