Model Selection in Regression Models

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The purpose of model selection is to choose one or more models from a set of possible models with specified desirable properties. Here we focus on regression type models for the relationship between a response vector y and a design matrix X. After a brief and general introduction on model selection in regression models the main focus is on the use of the bootstrap and how robust selection criteria can be constructed for linear, generalized linear and partially linear models. The selection of models can be based on measuring both, conditional expected prediction loss and description error. Further issues such as the dependence between selection and estimation, the optimal choice of tuning parameters and the impact particular assumptions have on the building of selection criteria are touched. Some open problems and ongoing research are mentioned.