2.2 Modifications of the SVM model

While the Support Vector Machine model was originally intended for classification tasks, analogous models following similar principles have also been developed to address other machine learning tasks such as regression or density estimation. Nice properties like margin maximization, convexity and duality are shared among these models and allow to study all of them under a common framework. In fact, they all can be regarded as particular cases of a generalized SVM model. This observation is crucial for the design of optimization algorithms addressing the SVM problem as being able to solve this generalized formulation immediately provides effective ways to deal with all the underlying particular models.

This section contains a review of the SVM model extensions of interest for this thesis concluding with the presentation of the general SVM formulation by Chang et al. [27]. Additionally and as a first minor contribution of this thesis, this formulation is further generalized to include as well the Least-Squares Support Vector Machine model for classification and regression [28].

Note that when discussing these alternative formulations, the original SVM model is sometimes referred in the literature as **Support Vector Classification** (SVC).

2.2.1 Support Vector Regression