

**Meeting:** 1000, Albuquerque, New Mexico, SS 15A, Special Session on Probabilistic and Geometric Methods in Learning Theory

1000-60-203            **Ingo Steinwart\*** (ingo@lanl.gov), Ingo Steinwart, CCS-3, Mailstop B256, Los Alamos National Laboratory, Los Alamos, NM 87544. *Fast Rates to Bayes for Support Vector Machines.*

We establish learning rates to the Bayes risk for support vector machines with hinge loss (L1-SVM's). Since a theorem of Devroye states that no learning algorithm can learn with a uniform rate to the Bayes risk for all probability distributions we have to restrict the class of considered distributions: in order to obtain fast rates we assume a noise condition recently proposed by Tsybakov and an approximation condition in terms of the distribution and the reproducing kernel Hilbert space used by the L1-SVM. For Gaussian RBF kernels with varying widths we also propose a geometric noise assumption on the distribution which ensures the approximation condition. This new geometric noise assumption is not in terms of smoothness but describes the concentration of the marginal distribution near the decision boundary. In particular we are able to describe nontrivial classes of distributions for which L1-SVM's using a Gaussian kernel can learn with almost linear rate. (Received August 24, 2004)