



# PAC-Bayesian approach for kernel methods

Joseph Salmon, Erwan Le Pennec

► **To cite this version:**

Joseph Salmon, Erwan Le Pennec. PAC-Bayesian approach for kernel methods. Journées MAS et Journée en l'honneur de Jacques Neveu, Aug 2010, Talence, France. <inria-00510287>

**HAL Id: inria-00510287**

**<https://hal.inria.fr/inria-00510287>**

Submitted on 17 Aug 2010

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Journées MAS 2010, Bordeaux

Session : Lois à priori parcimonieuses et estimation en grande dimension

## **PAC-Bayesian approach for kernel methods**

par **Joseph Salmon** et Erwan Le Penneç

In this work on regression with Gaussian error, we study an aggregation procedure relying on the exponential weighting scheme described in Dalalyan and Tsybakov [1]. We obtain PAC-Bayes oracle inequalities in this context valid in both the fixed design case and the random design case. These inequalities are obtained by techniques derived from those described in Catoni [2] and Audibert [3]. We apply those results to the selection of an "optimal" window for Nadaraya-Watson type estimators and obtain a provably efficient estimator implemented with a MCMC-type algorithm similar to the one proposed by Dalalyan and Tsybakov [3].

*Références :*

- [1] A. Dalalyan and A. Tsybakov, Sparse regression learning by aggregation and Langevin Monte-Carlo, in 22th Annual Conference on Learning Theory, COLT, 2009.
- [2] O. Catoni, Statistical learning theory and stochastic optimization, ser. Lecture Notes in Mathematics. Lecture notes from the 31st Summer School on Probability Theory held in Saint-Flour, 2001.
- [3] J.-Y. Audibert, Aggregated estimators and empirical complexity for least square regression, Ann. Inst. H. Poincaré Probab. Statist., vol. 40, no. 6, pp. 685-736, 2004.

*Adresses :*

Joseph SALMON

Laboratoire de Probabilités et Modèles Aléatoires, Univ. Paris 7  
175, rue du Chevaleret  
75013 Paris

E-mail : [salmon@math.jussieu.fr](mailto:salmon@math.jussieu.fr)

<<http://people.math.jussieu.fr/~salmon/>>

Erwan LE PENNEC

Laboratoire de Probabilités et Modèles Aléatoires, Univ. Paris 7  
Projet SELECT / INRIA Saclay / Université Paris Sud  
LPMA

175, rue du Chevaleret

75013 Paris

E-mail : [salmon@math.jussieu.fr](mailto:salmon@math.jussieu.fr)

<<http://people.math.jussieu.fr/~salmon/>>

Session : Lois à priori parcimonieuses et estimation en grande dimension