

# An exponential inequality under weak dependence

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Doukhan and Louhichi introduced a covariance-based concept of weak dependence which is more general than classical mixing concepts. We prove a Bernstein-type inequality under this condition which is similar to the well-known inequality in the independent case. We apply this tool to derive asymptotic properties of penalized least-squares estimators in Barron's classes.

*Keywords:* Barron's classes; Bernstein-type inequality; cumulants; neural networks; non-parametric autoregression; penalized least squares; weak dependence