A Chaining Algorithm for Online Nonparametric Regression

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We consider the problem of online nonparametric regression with arbitrary deterministic sequences. Using ideas from the chaining technique, we design an algorithm that achieves a Dudley-type regret bound similar to the one obtained in a non-constructive fashion by Rakhlin and Sridharan (2014). Our regret bound is expressed in terms of the metric entropy in the sup norm, which yields optimal guarantees when the metric and sequential entropies are of the same order of magnitude. In particular our algorithm is the first one that achieves optimal rates for online regression over Hölder balls. In addition we show for this example how to adapt our chaining algorithm to get a reasonable computational efficiency with similar regret guarantees (up to a log factor).

This is a joint work with Pierre Gaillard. The preprint is available on hal-01120813.