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## The many faces of online learning

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# Stellingen

Behorend bij het proefschrift  
The Many Faces of Online Learning  
van Dirk van der Hoeven

- 1 Exponential Weights should be seen and taught as (one of) the central method(s) in Online Learning alongside Online Mirror Descent and Follow the Regularized Leader rather than as a special case of Online Mirror Descent and Follow the Regularized Leader (Chapter 2).
- 2 One should exploit gaps between target losses and surrogate losses whenever possible (Chapter 6).
- 3 The portfolio selection task should be analysed using self-concordant barriers (Chapter 7).
- 4 Tuning of algorithms should be done automatically by the algorithms themselves, not by practitioners (Chapters 2, 3, 4, and 5).
- 5 Splitting the learning of the direction and scale of parameters is a natural way to analyse unconstrained algorithms for Online Linear Optimization (Ashok Cutkosky and Francesco Orabona. “Black-box reductions for parameter-free online learning in banach spaces”. In: *Proceedings of the 31th Annual Conference on Learning Theory (COLT)*. 2018, pp. 1493–1529).
- 6 In Online Classification, sometimes the right prediction is to abstain from predicting (Gergely Neu and Nikita Zhivotovskiy. “Fast Rates for Online Prediction with Abstention”. In: *Proceedings of the 33rd Annual Conference on Learning Theory (COLT)*. 2020, pp. 3030–3048).
- 7 One should use information from feature vectors in making predictions rather than only using feature vectors to define loss functions (Volodimir G. Vovk. “Competitive on-line linear regression”. In: *Advances in Neural Information Processing Systems 11*. 1998, pp. 364–370).
- 8 Sequentially predicting sport matches is a good way to empirically evaluate Online Learning algorithms (Vladimir Vovk and Fedor Zhdanov. “Prediction with expert advice for the Brier game”. In: *Journal of Machine Learning Research* 10. Nov (2009), pp. 2445–2471).
- 9 Comparing and studying algorithms can be significantly harder to do with experiments than with theoretical work.