

1163-60-1668

**Martin Larsson\*** (martinl@andrew.cmu.edu), **Aaditya Ramdas**, **Johannes Ruf** and **Wouter Koolen**. *Martingale methods for sequential learning*.

In a sequential learning problem one wishes to draw inference from data that is gathered gradually through time. This is the typical situation in many applications, including finance. A sequential learning procedure is ‘anytime-valid’ if the decision to stop or continue an experiment can depend on anything that has been observed so far, without compromising statistical error guarantees. A recent approach to anytime-valid inference views a test statistic as a bet against the null hypothesis. These bets are constrained to be supermartingales - hence unprofitable - under the null, but designed to be profitable under the relevant alternative hypotheses. This perspective opens the door to tools from financial mathematics. In this talk I will discuss how notions such as supermartingale measures, fork-convexity, and the optional decomposition theorem shed new light on anytime-valid sequential learning. (This talk is based on joint work with Wouter Koolen (CWI), Aaditya Ramdas (CMU) and Johannes Ruf (LSE).) (Received September 16, 2020)