

2017 Spring semester  
מספר הקורס: 236803

# Advanced Logic Seminar

יום ד' 1430-1630.

**Given by:** Eldar Fischer.

**Language:** Either Hebrew or English, depending on the composition of the participants.

This seminar will revolve around the reading and understanding of the following epic paper:

**Logical Induction**, by Scott Garrabrant, Tsvi Benson-Tilsen, Andrew Critch, Nate Soares, and Jessica Taylor

<https://intelligence.org/files/LogicalInduction.pdf>

This paper defines and presents “logical inductors”. Very roughly speaking, one wants to assign “probabilities” to logic sentences that may have very long proofs or refutations, based on knowing the truth values of all sentences that have shorter proofs. The inductors have to satisfy various properties; for example, the assigned probabilities should converge to the correct “0” or “1” value as they are fed more sentences with growing proof sizes.

The core definition is based on a financial metaphor: Consider the probabilities assigned by the inductor for every “day” (i.e., given all sentences with proofs up to a specific length). If some “trader” buys and sells “stock futures” whose prices are the probabilities assigned by the inductor, then there is no way for it to obtain an unbounded “profit” using only polynomial time computation.

For more information: <https://intelligence.org/2016/09/12/new-paper-logical-induction/>

**Intended audience and prerequisites:** The course is intended for near-finishing undergrad students and for graduate students. As expected it requires having finished the logic course, **either 234293 or 106156**. Apart from the subject matter itself, the course will relay the experience of reading and understanding a leading edge research paper (as opposed to handling a course or textbook).

**Requirements and grading:** You will have to read portions of the article in preparation to class, where in each class one of you will go over and explain some proofs from the weekly portion for the benefit of the class. Additionally you may be required to write supplementary material to help with the understanding of the paper and of your talk. Grading will be based on your performance in these tasks.

**How to enroll:** Email me at [eldar@cs.technion.ac.il](mailto:eldar@cs.technion.ac.il) before **February 20**. The course will only open if sufficiently many people are enrolled.