

Final Exam

- The final will take place Tuesday December 9, 2008 from 12:30-3:00 PM in PAC 9.
- There will be a list of Q&A maintained on the website; you can email me questions any time.
- You can bring a crib sheet that is **in your handwriting, not computer-printed** to the final exam. It must be on a **letter-size** (8.5" × 11") sheet of paper. (No magnifying glasses!) You can use both sides.
- Office availability is TBA and will be kept up to date on the website.
- A practice exam (Fall 07) is available on the course website; solutions are on ACE.
- Some sample problems are given at the end of this handout.
- There will be a mix of short answer and long questions. About 1/4 of the exam is each on: pure strategies & equilibria; mixed strategies & equilibria; extensive games; strategic games.
- Public Service Announcement: if you want to apply for an Undergraduate Research Assistantship, which is a 4-month program paying about \$2500/month, visit

http://www.math.uwaterloo.ca/Cand0_Dept/SummerResearch/ura2009ad.shtml

Potential Question Topics

Strategic Games / Fundamentals

Yes: Strategic games. Strict domination, weak domination, weakly dominant strategies, best responses. Finding pure Nash equilibria. Finding mixed Nash equilibria in 2×2 games and zero-sum 2 player games. Finding symmetric mixed equilibria, the Support Characterization.

No: Old proof of Zermelo's theorem. Population games. Solving LPs by hand. Performing the tableau method for the Lemke-Howson algorithm. Fixed-point theorems.

Extensive Games

Yes: How to formulate an extensive game. Pure SPEs and backwards induction. Chance and simultaneous moves. Finitely and infinitely repeated games, discounting.

No: Mixed SPEs, behavioural strategies. Cake-cutting.

Impartial Combinatorial Games

Yes: P and N positions. Game sums, copycat principle, P-ignorance. Calculating Grundy values. Winning strategy in Nim. Finding winning moves in any impartial combinatorial game.

No: Game products, squeeblecross.

Final Projects

Yes:

No: Everything.

We guarantee that on the final exam, any specific games we have seen such as duopoly, Bowling, etc., that appear will include a full definition. You can assume all payoff functions are Bernoulli with vN-M preferences.

Some Suggested Study Problems

Note: this list is not meant to be complete!

- Strategic Games
 - Show that if a 2×2 game has more than 3 mNE's, it has an infinite number of mNE's.
 - Exercises 117.2, 130.2 from Osborne.
 - Make a strategic game, find its mNE using <http://banach.lse.ac.uk/form.html>, and check by hand that the support characterization holds.
 - Show that if (α_1, α_2) and (α'_1, α'_2) are mNE of a 2-player zero-sum game, so is (α_1, α'_2) .
 - (hard) Prove that the result of iterated elimination of strictly dominated strategies doesn't matter on the order of elimination.
- Extensive Games: 156.2c, 176.2, 177.2, 210.2, 211.1, 227.2, and Section 7.6.2 from Osborne.
- Impartial Combinatorial Games
 - Create your own take-and-break game and compute the Grundy values.
 - Play Nim against the computer and win at http://gotofreegames.com/nim/free_nim_puzzle.htm (choose “Computer (2)” if you want to go first).