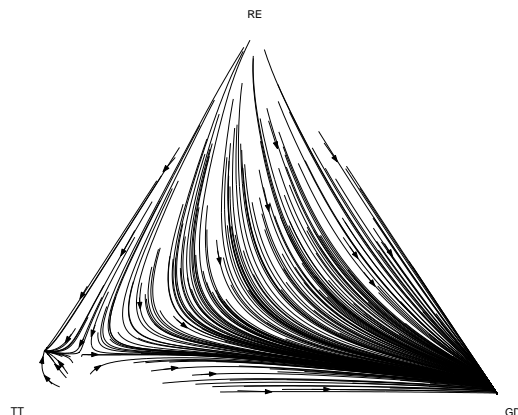


AUTOMATED MECHANISM DESIGN (2)

Most recent work

- HSA gives us a nice tool for looking at different kinds of auction.
- But it is sensitive to the list of heuristic strategies.
- Since Marek had implemented GD, we can try using that instead of PvT.
- (We want to keep TT because it tells us if mechanisms are strategy-proof.)
- (We want to keep RE because it simulates the way that people play.)
- (It is hard to visualise more than 3 strategies.)
- What do we get.

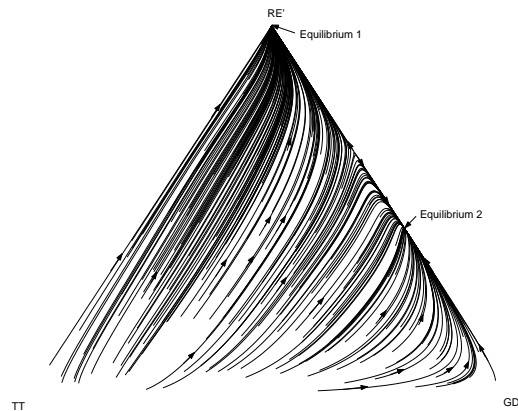
GD rules



Or does it?

- The problem with the HSA analysis is that we don't have a good measure of its robustness.
- The payoffs for each point are computed over a heinous number of runs, but there is still a fair amount of variance.
- So the results we get *might* happen by chance.
- Try a perturbation analysis.

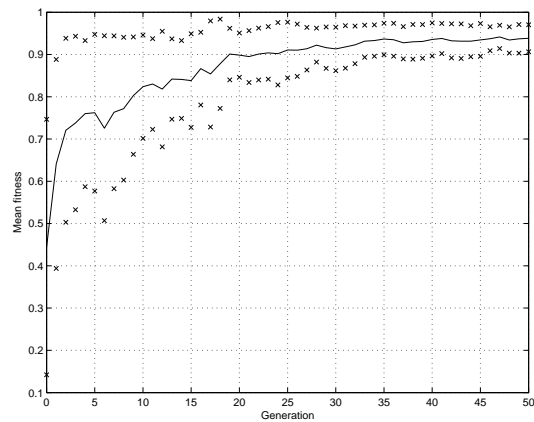
5% of GD profits given to RE



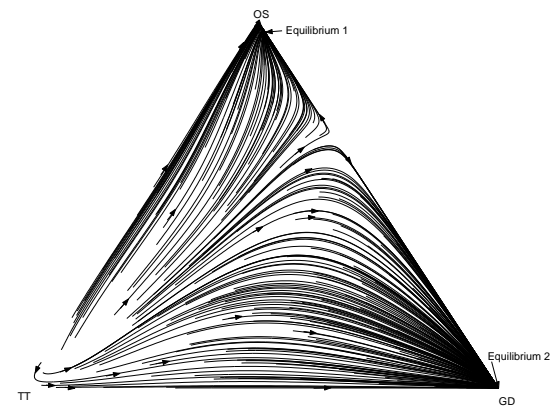
Tweaking RE

- Maybe we can find a replacement for RE that can grab that extra bit of profit and challenge GD.
- Use a GA to learn parameters for:
 - Standard RE;
 - Tesfatsion's augmented RE;
 - Q-learning; and
 - Random action
- Payoff computed from the $(0.25, 0.25, 0.25, 0.25)$ point.

Convergence over time



Q-learning wins out



Summary

- Working our way towards automated mechanism design.
- We can rate different kinds of auction mechanism in a meaningful way.
- We can evolve different bidding mechanisms within a given mechanism,
 - So, given a mechanism, we can see what the best way to bid within it is.
 - At least given a plausible set of heuristic strategies.
- So, maybe we are now in a position to start real coevolution of mechanisms and traders...