Review of: "A trial-dependent N-player game"

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Potential competing interests: No potential competing interests to declare.

This appears to be a paper in elementary probability theory, not game theory. As a game theorist I am not especially qualified in reviewing this paper. Nonetheless I will make some remarks.

The statement of the problem studied is not clear. My understanding is this. There are N agents. In each round, 1 agent is randomly chosen to receive 1 dollar from each other agent (for a total of $N-1$ dollars). Agents start with an initial budget. The process ends when the budget of some player is exhausted, i.e. when his wealth reaches 0. The probability of a given agent being chosen in a given round does not depend on the round, but may depend on the agent.

If my understanding is correct, this is not a game, but a stochastic process. No agent ever has a choice to make.

The author divides the agents into 2 groups, those with a minimal budget and those with a higher budget. The analytical relevance of this distinction is not clear. Since the agents are asymmetric in winning probabilities, the time when the process terminates will depend on the agents in both groups. E.g. If one agent has a budget of 10 and a probability of winning of .9, while a second agent has a budget of 11 and a winning probability of .1, then the process is more likely to end with the bankruptcy of agent 2, even though he is in group 2.

The two propositions in the paper appear to concern a different process that is stopped at an exogenous time α. α is also the minimal budget among agents, which means that this is the earliest time the original process could terminate (if one of the agents with minimal budget loses α rounds in a row). Since the new process is stopped at an exogenous time, it is unclear what the role of the budgets is, since budgets only affect the termination time in the original process. The new process, denoted Θ in the paper, does not seem to depend on the “game-like” nature of the original process, i.e. on the interactions between the agents. It appears to simply be a random walk with asymmetric steps and probabilities. These are well-understood processes.

Even though it is unclear to me what the role of the budgets is in the new process, the 2 propositions show different results for the 2 different groups. Since the propositions are given without proof or even justification, it is impossible to gauge whence the results. It is thus unclear to me how the results pertain to the model and why they are true.

Some auxiliary remarks. The introduction contains many formulas, but does not make it clear what is being calculated. It contains almost no motivation and does not make it clear exactly what the contribution is compared to the literature. The notation is awkward (A_i refers to both agents and their budget at the exogenous stopping time) and some notation is introduced and abandoned almost immediately (X and Θ). The numerical investigation is just a table of evaluations of

explicitly given formulas. If there is any interest in that, a few graphs would seem more informative. Finally - I say this with some reluctance - there are many mistakes in the English.