Posterior implementability in an n-person decision problem

Abstract:

Abstract: Posterior implementation is a solution concept for mechanism design with interdependent values. It requires that each agent's strategy is optimal against the strategies of other agents for every possible message profile. Green and Laffont (1987) give a geometric characterization of posterior implementable social choice functions for binary collective decision problems with two agents and non-transferable utility. This paper generalizes the analysis to any finite number n of agents, with three main insights. First, posterior implementable social choice functions are posterior implementable by score voting: each agent submits a number from a set of consecutive integers; the collective decision is determined by whether or not the sum exceeds a given quota. Second, the possibility for posterior implementation depends crucially on the number of agents: in generic environments with $n \geq 3$ agents, a (responsive) social choice function is posterior implementable if and only if it is Bayesian implementable by unanimity voting. By contrast, with $n = 2$ agents, every monotone and deterministic social choice function that is Bayesian implementable is also posterior implementable. The third insight involves two applications: the equivalence result for simultaneous and sequential majority voting in symmetric environments by Dekel and Piccione (2000) is a knife-edge case—the voting order typically affects equilibrium outcomes; the characterization of monotone Bayesian implementation for $n = 2$ agents by Li, Ro