A Process Algebraic Form to Represent Extensive Games

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Suppose one wants to present a game with n agents using the extensive form which is a directed graph whose nodes are players and whose edges are actions. Then assume that each agent has two actions available, the game is given by a graph with size $O(2^n)$. However, if one can explain the behavior of each agent individually by an adequate process (called *process-game*), and then obtain the whole of the game through *parallel composition* of these *process-games*, he could represent the same game in $O(n)$. We take advantages of process algebra to define process-game and the appropriate notion of parallel composition for them. In order to compact the representation of games with lots of players, we modify the process theory in an appropriate manner to provide a model called *"process-game"* that encompasses both process theory and game theory notions. This proposed process algebraic model makes it possible to have a compact representation for extensive gamesspecially in social extensive games which have local interactionvia appropriate parallel composition.