

# Pure equilibria in large games

R. Ramanujam and Sanjukta Roy

Institute of Mathematical Sciences,  
Chennai, India

August 17, 2015

Large games are non-cooperative game with a large number of players. In such games, a player cannot reasonably strategize about the behaviour of all other players. Game theorists study such games by payoffs that depend only on distributions of choices (rather than profiles). Thus, in a 100 player game with 3 choices, for a profile of 50 players choosing  $a$ , 30 choosing  $b$  and 20 choosing  $c$  would offer a payoff  $(x, y, z)$  with  $x$  being the payoff for all players choosing  $a$  etc. Clearly, providing epistemic foundations for strategizing in such games is interesting and challenging.

We have been investigating the mathematical theory of such large games. We can show that for the class of games with *direction preserving* best-response maps, Nash equilibria always exist in pure strategies.