

Math 225 – Simulation Project

In this project, you will use random simulation to determine the optimal strategy for a multi-player non-cooperative game. On the long-running television game show *The Price Is Right*, three players compete for the right to advance to another game with the biggest prizes.

Each player spins a wheel that is equally likely to land on amounts from \$.05 to \$1.00, including one space with each multiple of five cents. The object is to be the player that comes closest to \$1.00 without exceeding that amount, by either a single spin or a sum of two spins. Any player who accumulates more than \$1.00 is eliminated. The only skill in the game is in the decision of whether to take a second spin if tied or leading (as a second spin is necessary if trailing.) In the event that the game ends in a tie, a random tiebreaker (each player taking one additional spin, starting from zero) determines the winner.

Any player who gets exactly \$1.00 in a single spin or the total of two spins, wins \$10,000 and gets a bonus spin. In the bonus spin, an additional \$10,000 is awarded if the wheel lands on \$.05 or \$.15, and \$25,000 extra is awarded if their wheel lands on \$1.00.

Use random simulation to determine the optimal strategy and win probability for each player. Explain any assumptions that are relevant to your model, and use graphs/charts where needed. Along with your technical report, include a brief summary of strategy “rules,” written for a contestant.

In addition, pose an extension of this problem, and perform a strategic analysis for that game.