

Colloquium

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THE MULTIPLAYER GAMBLER'S RUIN PROBLEM

Friday, October 21, 2022
3:00 p.m. in BB-B012
(tea & coffee at 2:45 p.m.)

ABSTRACT. Two players repeatedly play a fair game, exchanging one token after each game while the total number of tokens in play, N , is fixed. If player A starts with x tokens, what is the probability that they will end up with all the tokens? This is a basic question for undergraduate probability course and the answer is x/N . In this talk, I will discuss the gambler's ruin problem involving three or more players. Suppose three players play as follows: a total of N tokens are in play and (a, b, c) is the initial distribution of tokens between the three players. At each stage, a random pair of the three players plays a fair game and exchange one token. Let $P(N, A, a, b, c)$ be the probability that player A ends up losing all their tokens first. $P(N, A, N - 2, 1, 1)$ is the probability that the very dominant player A starting with most the tokens ends up losing first. Can you guess the order of magnitude of $P(N, A, N - 2, 1, 1)$?