MATHEMATICS

Gambler's ruin with different strategies

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At a certain casino game if you bet $x you will loose your $x with probability .505 (so your fortune will decrease by x) and win $2x with probability .495 (so your fortune will increase by x). You walk into the casino with $25 dollars with the goal to get $500.

Compute the probability for you to succeed if you use the following strategies

1. You make repeated $5 bets until you either win $500 or you are wiped out.
2. You make repeated $25 bets until you either win $500 or you are wiped out.
3. You play bold strategy, i.e, Bet everything you can but no more than necessary

How would you approach this?

probability expected-value gambling

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asked 1 hour ago

Mining
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1 It is a classic problem given under its usual name, so you can easily look up detailed solutions online. The standard solution is to solve a recurrence relation based on the total probability formula. For example the probability you win starting with $25 in the first problem is 0.505 times the probability you win starting with $20 plus 0.495 times the probability you win starting with $30. The second problem is the same. The third problem is slightly different, since you need to map out the state space carefully, but once you have done so the method is fairly similar. – Ian 1 hour ago