Preliminary analysis pf Texas Hold’em Bonus

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Findings:

In Texas Hold’em Bonus, player will make a decision for the game at each step, i.e. , continue the game or fold conditional on two hole cards, , make a bet or check conditional on two cards in hand and three cards (flop), , make a bet or check conditional on two cards in hand, three cards (flop) and the fourth card (turn). Then the problem becomes that how the player should make the decision at each step to play the game. We solve this problem using Dynamic Programming method.

Dynamic programming is an optimization approach that transforms a complex problem into a sequence of simpler problems. Within this Texas Hold’em Bonus problem, we apply this method to find a sub-optimal strategy as our optimal strategy for playing. After finding the optimal strategy, we conduct Monte-Carlo simulations to find expectations and variance.

Denote as the player’s card. as three cards at flop, as turn cards (and as river cards),

Dynamic strategy is derived retrospectively as below:

1. For some observed , for the bet on the river, we earn , where

Then decision

1. For some , for the bet on the turn, we earn , where

Then decision

Question: Should decision based on the bonus information?

1. For some , for the bet on the flop, we earn , where

Then decision

Then from the beginning, for each , we could have their decision and subsequent based on , based on .

