Home

This Month

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Gambling on mistakes

Although the odds are stacked against you at both roulette and blackjack there's a sure way to win - play two games of one, and then shift to the other for two games and then shift back again.

If a shifty-looking character whispered these words to you in a casino, it's a fair bet that you would conclude the individual was mad or employed by the casino. Yet two Adelaide mathematicians have demonstrated that the strategy can work in a somewhat similar situation.

Continuing the tradition of progress in probability theory stemming from research into gambling, Dr Derek Abbott and Dr Greg Harmer of Adelaide University have published an article in *Nature* on the insights gambling can throw on Parrondo's paradox. This paradox refers to the demonstration by a Spanish physicist that are doomed to fail on their own can be combined for a successful outcome. The paradox emerged as an illustration of Brownian machines, which manage to produce work from the random motion of atoms.

The pair, from the School of Electrical and Electronic Engineering, designed two games around biased coins. In each game the player will lose in the long run because, as at the casino, the bias runs against them.

However, of a player completes two rounds of each game before swapping enables the player to win, although not as well. The pair admit they don't really understand how the system works. One of their papers asks: "Where is the 'energy' coming from in Parrondo's games?"

The strategy is of little use in a real casino, as your chances of winning in one of the games must depend on how much money you have.

However, Parrondo's paradox turns up in other areas of our lives. Shaking something creates disorder. However, repeated shaking of a bag of nuts generates a "ratchet effect", where the smaller nuts fall to the bottom to create a more ordered system.

Another example quoted is how two pests, such as

insects and sparrows, will each eat crops in isolation. However, it they occur together the sparrows may eat the insects, producing less overall damage to the fields then either species on its own.

More speculatively, Dr Abbott wonders whether the same rules may apply to politicians. Might an otherwise bad sex scandal sane a politicians standing if it distracts from unpopular policies?

According to Dr Abbott, the applicability of their work is broad. "It could help to answer financial questions, such as finding the best strategy for combining high-risk shares and cash reserves in managing an investment portfolio. In biology, a population of animals contains a certain pool of genes, some of which are good and bad. some bad genes may become beneficial if there is a change in the environment."

Professor Paul Davies has even speculated that a similar process may have allowed the formation of life, with a "ratcheting action" enabling some random events to eventually create self-replicating molecules.

Stephen Luntz.