

Parrondo's Paradox

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Game A

Biased Coin:

Heads I win £1

Tails you win £1

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Tails you win £1

$$P(\text{Heads}) = 0.5 - \varepsilon \quad \text{where } \varepsilon = 0.005$$

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A losing game for heads

Game B

Game B

Two Biased Coins:

Heads I win £1

Tails you win £1

If your winnings are a multiple of 3
play with coin 1 otherwise use coin
2.

Game B

Game B

Coin 1:

Game B

Coin 1:

$$P(\text{Heads}) = 0.1 - \varepsilon$$

Game B

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Game B

Coin 1:

$$P(\text{Heads}) = 0.1 - \varepsilon$$

Coin 2:

Game B

Coin 1:

$$P(\text{Heads}) = 0.1 - \varepsilon$$

Coin 2:

$$P(\text{Heads}) = 0.75 - \varepsilon$$

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A losing game for heads

I lose!

Next Offer

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Suppose we play a random mixture of
games:

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Suppose we play a random mixture of games:

So randomly play Game A or Game B

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Same odds / same conditions.

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Do you still want to play?

I Win!

Parrondo's

