

# Monte Carlo simulations

Eugeniy E. Mikhailov

The College of William & Mary



Lecture 14

# Coin flipping bets

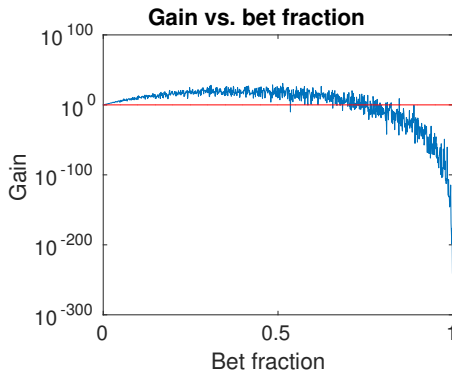
Imagine the game where someone spins a coin.  
If the coin falls face up (50/50 chance) you get your bet quadrupled,  
otherwise your bet is taken by another player.

What fraction of your money should you bet each time to get the maximum gain?

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# Matlab's `arrayfun`

It usually requires an extra effort to program a function which accepts an array

Deliberately bad example

```
x_squared=@(x) x^2;
```

If we send in a non square array, we will get an error.

What if we want to apply our function to an array?

We can use loops, but this is bulky and messy code.

Instead we can use `arrayfun`

```
x=[1,2,3,4];  
xsq = arrayfun(x_squared, x)  
xsq =  
     1     4     9    16
```

# The Monty Hall Paradox

Suppose you have 'N' doors; a price is placed behind one of them.

- 1 make your choice of a door
- 2 host rules out all other doors without the prize behind but one
- 3 now you face 2 doors (one is chosen by you and the other)
- 4 behind one of them the prize is located
- 5 should you change your mind and pick the other door?

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What is more deadly, a highly contagious disease with the low mortality rate or a not so contagious disease with the high mortality rate?

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