

§ 2 Probability

2.1 Introduction

Empirically the notion of probability is basically the frequency with which something occurs in the long term.

e.g. Flip a coin 10,000 times and get heads $\sim 50\%$ of the time & tails $\sim 50\%$ of the time. Notice that the fractions tend to get closer to 50% the more flips we do.

Infer Chance of heads is $\frac{1}{2}$ (50%)
tails is $\frac{1}{2}$ (50%).

Mathematically probability theory is a consistent system we can use to calculate certain quantities e.g. probabilities, averages.

Experience of the real world shows us that if we start with empirical data and then apply the mathematics of probability theory to these data, we get answers which agree with real-world observations.

Historically probability theory goes back to gambling.