STAT 801: Mathematical Statistics

Statistics versus Probability

Standard view of scientific inference has a set of theories which make predictions about the outcomes of an experiment:

Theory	Prediction
A	1
B	2
C	3

Conduct experiment, see outcome 2: **infer** B is correct (or at least A and C are wrong).

Add **Randomness**

Theory	Prediction
A	Usually 1 sometimes 2 never 3
B	Usually 2 sometimes 1 never 3
C	Usually 3 sometimes 1 never 2

See outcome 2: infer Theory B probably correct, Theory A probably not correct, Theory C is wrong.

Probability Theory: construct table: compute likely outcomes of experiments.

Statistics: inverse process. Use table to draw inferences from outcome of experiment. How should we do it and how wrong are our inferences likely to be? Notice: hopeless task unless different theories make different predictions.

Start with Probability; switch after about 5 weeks to statistics.