Section 7.4: Type I and Type II Errors

Tuesday, March 13, 2018 3:51 PM

When performing a test of hypothesis, there are potentially two types of errors that can result

We classify these into:

Type I error: reject H_0 when H_0 is actually true

Type II error: don't reject H_0 when H_0 is actually false

---

example: situation: movement in grass

null hypothesis: it's just the wind
alternate hypothesis: it's a jaguar!

a) state in words what a Type I error would be

Type I: reject H_0 when H_0 is actually true

You think it's a jaguar when it's actually the wind.

b) state in words what a Type II error would be

Type II: accept H_0 when H_0 is actually false

You think it's the wind when it's actually a jaguar

Decision	Truth/Reality: Null hypothesis H_0 is true	Truth/Reality: Null hypothesis H_0 is false
Reject H_0	Type I error false positive	correct outcome true positive
Accept H_0	correct outcome true negative	Type II error false negative

---

the probability of each type of error:

$$P(\text{Type I error}) = \alpha$$

recall: confidence level is $1-\alpha$
(α is sometimes called the significance level)

so if you are 95% confident about something, then the odds of a Type I error are 5%

$P(\text{Type II error}) = \beta$ ← much more complicated to calculate and we're not going to bother

---

note: because of the possibility of a Type II error, Statisticians tend to say

"we do not reject H_0"

rather than

"we accept H_0"