Homework 13

Chen Xupeng

2018/1/2

1

First we use the rank test

H_0 : there is no difference in means of the two testers results.H_1 : there is a difference

```
A<-c(4.3,3.2,3.8,3.5,3.5,4.8,3.3,3.9)
B<-c(3.7,4.1,3.8,3.8,4.6,3.9,2.8,4.4)
A-B
```

```
## [1]  0.6 -0.9  0.0 -0.3 -1.1  0.9  0.5 -0.5
```

```
# n=7, n+=3
binom.test(3,7,p=0.5,conf.level =0.95)
```

```
##
##  Exact binomial test
##
## data:  3 and 7
## number of successes = 3, number of trials = 7, p-value = 1
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.09898828 0.81594843
## sample estimates:
## probability of success
##              0.4285714
```

$$p = 1 \text{ so we do not reject } H_0$$

For wilcoxon rank test

```
wilcox.test(A-B,correct=FALSE,exact=FALSE)
```

```
##
##  Wilcoxon signed rank test
##
## data:  A - B
## V = 12, p-value = 0.7353
## alternative hypothesis: true location is not equal to 0
```

$$p = 0.7353 > 0.05, \text{so we do not reject } H_0$$

2

```r
boys<-c(80,96,98,87,75,83,70,92,97,82)
girls<-c(82,90,84,70,80,97,87,88,88)
wilcox.test(girls,boys,conf.level=0.95,exact=FALSE)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  girls and boys
## W = 43.5, p-value = 0.9348
## alternative hypothesis: true location shift is not equal to 0
```

H_0 : There is significant difference between boys' and girls' math abilitiesH_1 : There is no difference

we cannot rejectH_0

3

we ignore the days difference in different month

H_0 : The births are uniformly distributed in 12 months

```r
X<-c(3478,3333,3771,3542,3479,3304,3476,3495,3490,3331,3188,3321)
 chisq.test(X)
```

```
##
##  Chi-squared test for given probabilities
##
## data:  X
## X-squared = 72.455, df = 11, p-value = 4.161e-11
```

$p < 0.05$, so we reject H_0, the births are not uniformly distributed in 12 months

4

```r
x<-c(22,98,25,22,89,16)
X<-matrix(x,nc=3,byrow=TRUE)
chisq.test(X)
```

```
##
##  Pearson's Chi-squared test
##
## data:  X
## X-squared = 1.2229, df = 2, p-value = 0.5426
```

Lung cancer is not associated with amount of smoking

5

We use K-S test

```
X<-c(-2.46,-2.11,-1.23,-0.99,-0.42,-0.39,-0.21,-0.15,-0.10,-0.07,-0.02,0.27,0.40,0.42,0.44,0.70,0.81,0.8
ks.test(X,"pnorm",0,1)
```

```
##
##  One-sample Kolmogorov-Smirnov test
##
## data:  X
## D = 0.17724, p-value = 0.3683
## alternative hypothesis: two-sided
```

we do not rejectH_0, the data is distributed as $N(0,1)$

We use K-S test

```
X<-c(-2.46,-2.11,-1.23,-0.99,-0.42,-0.39,-0.21,-0.15,-0.10,-0.07,-0.02,0.27,0.40,0.42,0.44,0.70,0.81,0.8
shapiro.test(X)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  X
## W = 0.93759, p-value = 0.1302
```

we do not rejectH_0, the data is distributed as $N(0,1)$