Sign Test on Paired data

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Introduction

- Reduces paired data into binomial information of +/-
- Less powerful than Wilcox Ranked Sign
- Should probably use Wilcox Ranked Sign instead, but this is easier on paper

Data Set

We will use the immer data set which describes the yield of barley field from one year to the next year

```
##   Loc Var    Y1    Y2
## 1  UF   M  81.0  80.7
## 2  UF   S 105.4  82.3
## 3  UF   V 119.7  80.4
## 4  UF   T 109.7  87.2
## 5  UF   P  98.3  84.2
## 6   W   M 146.6 100.4
```

Using the sign test

- To test this numerically, instead of counting +'s and -'s, it's easier to just test against a median of zero

```
diff <- immer[,4] - immer[,3]
sign_test <- SIGN.test(diff, md = 0.0)
cat("P-Value is", sign_test$p.value,
    "with true median at", sign_test$estimate)
```

```
## P-Value is 0.001430906 with true median at -21.7
```

Wilcox Example

- Testing with Wilcox to see difference in values

```
wilcox_test <- wilcox.test(immer[,3], immer[,4])
cat("P-Value for Wilcox Sign Rank Test is",
    wilcox_test$p.value)
```

```
## P-Value for Wilcox Sign Rank Test is 0.04058663
```