

Statistics CH9

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9.1.0.1 Exercise

a.

```
k = 1e5
n = 6
T = numeric(k)
for (i in 1:k){
  X = rnorm(n, mean = 0, sd = 1)
  T[i] = max(X) - min(X)
}
T_cv = quantile(T, 0.95)
T_cv
```

```
##      95%
## 4.022117
```

b.

```
X = c(2.0, 2.9, -0.5, 0.3, -0.8, -0.1)
T1 = max(X) - min(X)
T1 > T_cv
```

```
##      95%
## FALSE
```

9.1.0.3 Exercise

```
power = function(sigma2){
  k = 1e5
  rej = numeric(k)
  for (i in 1:k){
    X = rnorm(n, mean = 0, sd = sigma2**0.5)
    T = max(X) - min(X)
```

```

    rej[i] = T > T_cv
  }
  mean(rej)
}
power(2)

```

```
## [1] 0.33781
```

9.1.0.4 Exercise

a.

```

k = 1e5
n = 6
T = numeric(k)
for (i in 1:k){
  X = rnorm(n, mean = 0, sd = 1)
  T[i] = var(X)
}
T_cv = quantile(T, 0.95)
T_cv

```

```
##      95%
## 2.209009
```

b.

```

power = function(sigma2){
  k = 1e5
  rej = numeric(k)
  for (i in 1:k){
    X = rnorm(n, mean = 0, sd = sigma2**0.5)
    T = var(X)
    rej[i] = T > T_cv
  }
  mean(rej)
}
power(2)

```

```
## [1] 0.3556
```