

HW1-Q4

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```
c<-1.5
y1m<- 42; s1sq<- 41; n1<- 11
y2m<- 51; s2sq<- 65; n2<- 9
df<- n1+n2-2
s1psq<- ((n1-1)*s1sq + (n2-1)*s2sq/c)/df

tObs<- (y1m - y2m)/sqrt(s1psq*(1/n1+c/n2))
pval<- 2*(1-pt(abs(tObs), df))
pval

## [1] 0.01359739

set.seed(407)

sigma<- sqrt(40); theta<- 0.5; ratio=1.5; alpha<- 0.05; Runs<- 5000

n1<-seq(5,300, by=1)
power<- numeric(0)

for(i in 1:length(n1)){
  n2<- 1.5*n1[i]; df<- n1[i]+n2-2; tval<- qt(1-alpha/2,df)

  diff<- rnorm(Runs,mean=theta*sigma,sd=sigma*sqrt(1/n1[i] +c/n2))
  s2<- sigma^2*rchisq(Runs,df=df)/df
  ts<- diff/sqrt(s2*(1/n1[i]+1/n2))

  power[i]<- sum( abs(ts) >= tval)/Runs
}

n<- 2.5*n1

plot(n,power,type = "l",main = "Power of Two-Sample T-Test using simulations",
     xlab = "n",ylab = "Power")
```

Power of Two-Sample T-Test using simulations

