Assignment VI

YEP

03/01/2018

Analytical Solution

Power=Pr(Reject $H_0|\mu \neq 0$):

$$Pr(|\frac{\bar{x}-0}{1/\sqrt{n}}| > 1.96|\mu \neq 0)$$

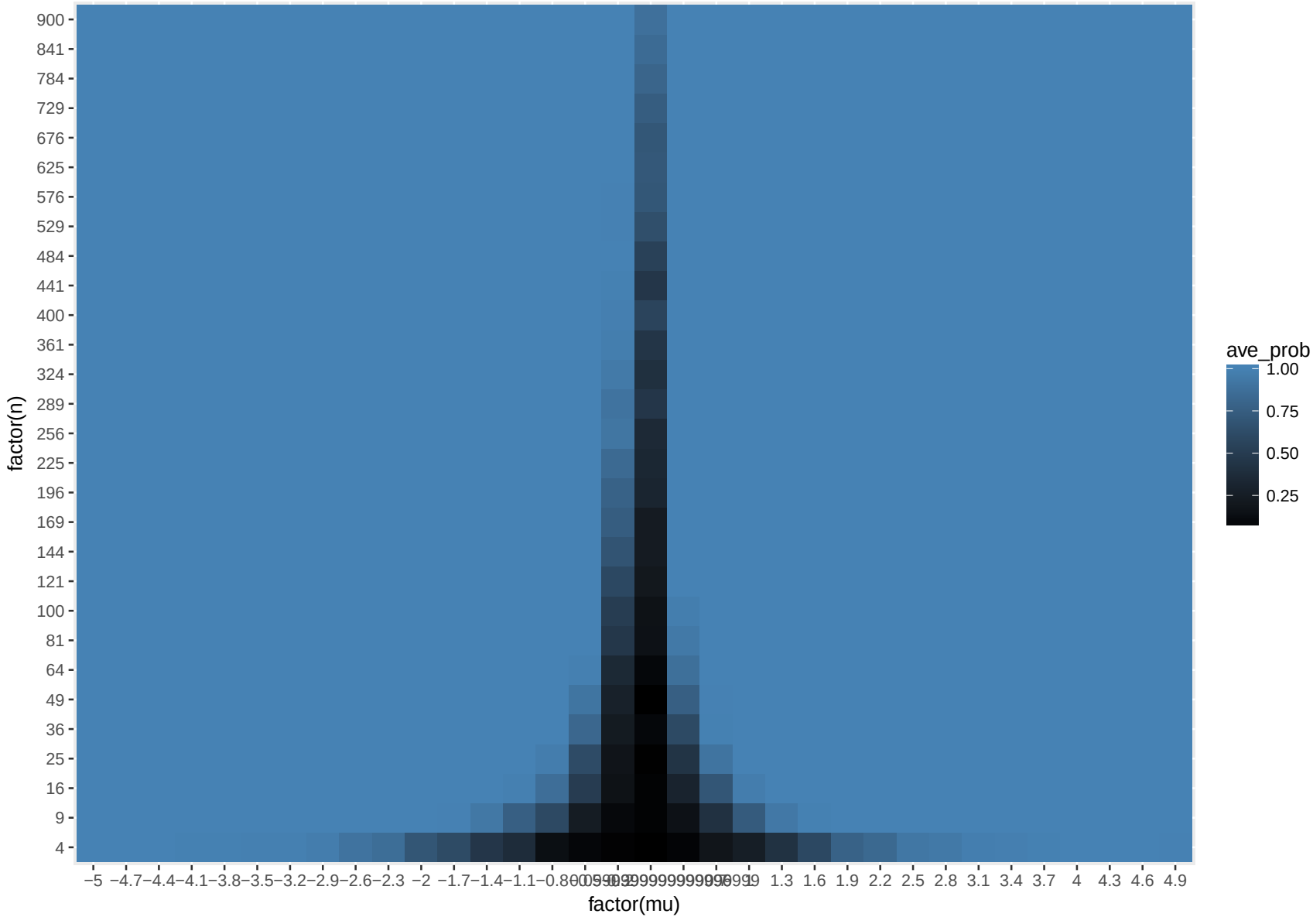
$$Pr(\frac{\bar{x}-\mu}{1/\sqrt{n}} > \frac{\frac{1.96}{\sqrt{n}}-\mu}{1/\sqrt{n}}) = Pr(Z > 1.96 - \sqrt{n}\mu)$$

$$Pr(\frac{\bar{x}-\mu}{1/\sqrt{n}} < \frac{\frac{-1.96}{\sqrt{n}}-\mu}{1/\sqrt{n}}) = Pr(Z < -1.96 - \sqrt{n}\mu)$$

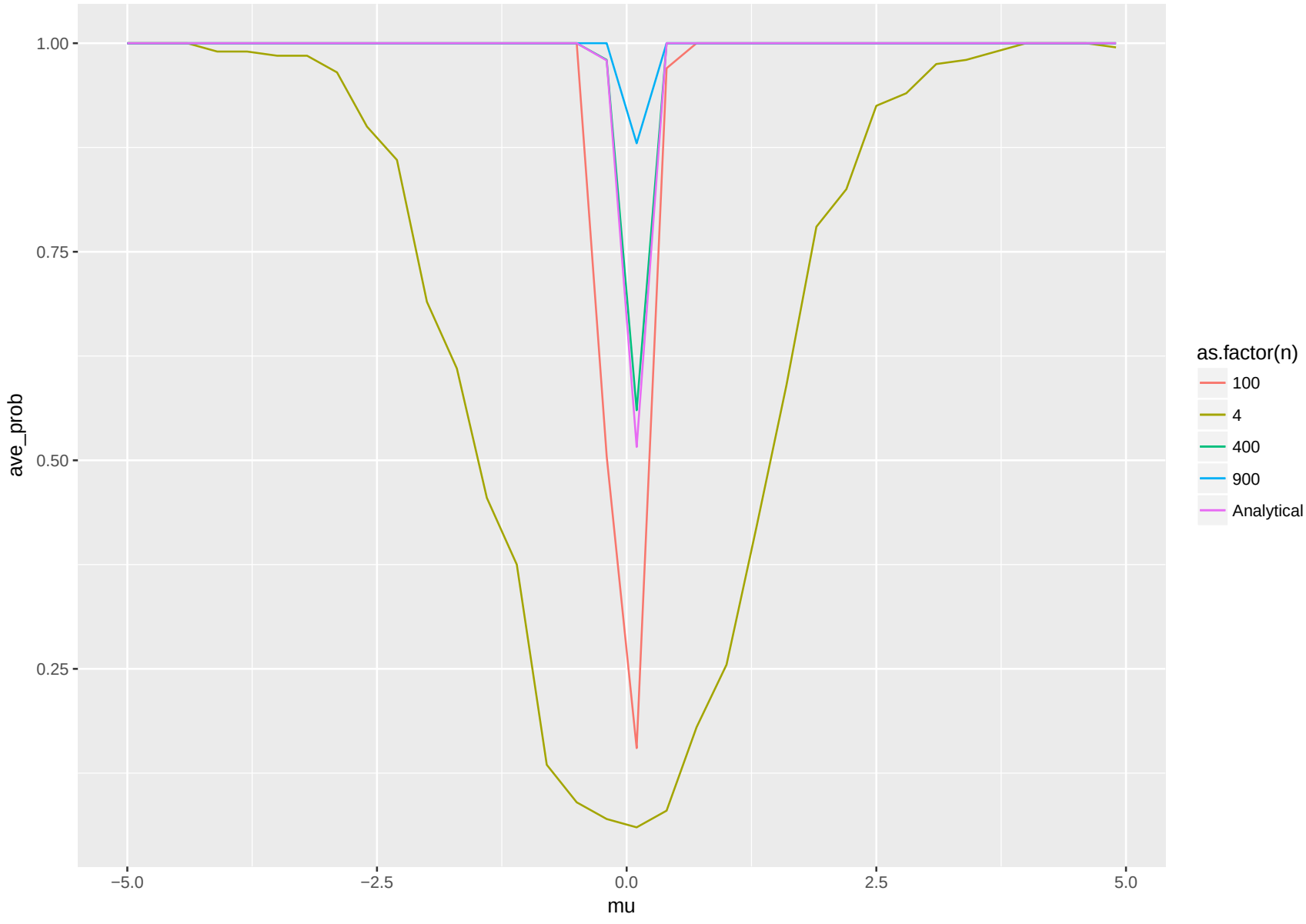
$$= Pr(Z > 1.96 - \sqrt{n}\mu|\mu \neq 0) + Pr(Z < -1.96 - \sqrt{n}\mu|\mu \neq 0)$$

$$= 1 - \Phi(1.96 - \sqrt{n}\mu) + \Phi(-1.96 - \sqrt{n}\mu)$$

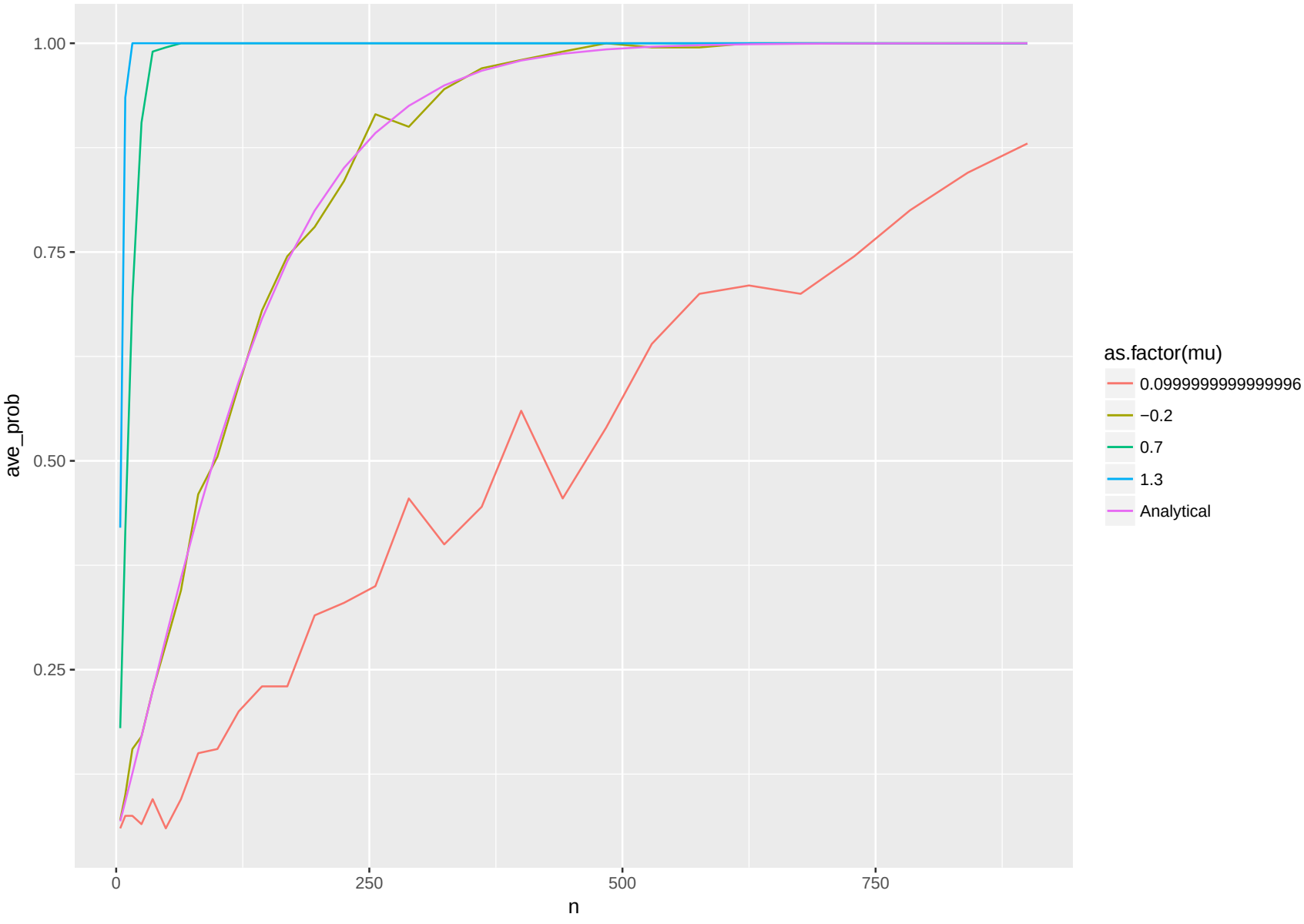
Average rejection rate



Power Curve


1.00
0.75
0.50
0.25
ave_prob
−5.0
−2.5
0.0
2.5
5.0
mu
as.factor(n)
100
4
400
900
Analytical

Power Curve


1.00
0.75
0.50
0.25
ave_prob
0
250
500
750
n
as.factor(mu)
0.0999999999999996
−0.2
0.7
1.3
Analytical

```r
#Power, n=500, m=1
1-pnorm(1.96-sqrt(500))+pnorm(-1.96-sqrt(500))
```

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

```r
#Power, n=11, m=1
1-pnorm(1.96-sqrt(11))+pnorm(-1.96-sqrt(11))
```

```
## [1] 0.9125498
```