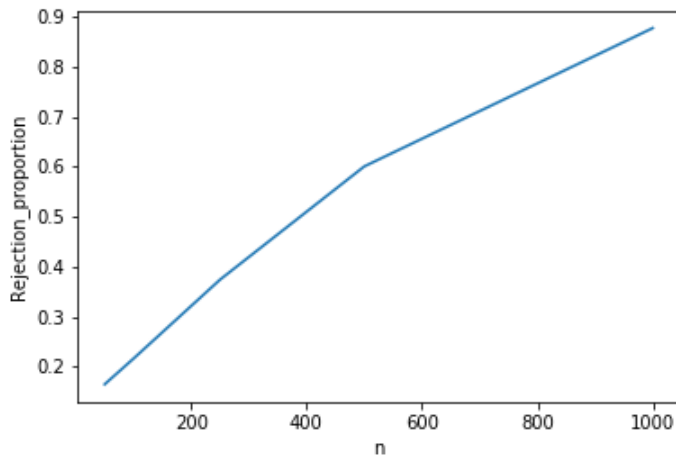


## LAB 3,ACS2, PANKAJ CHOUHAN

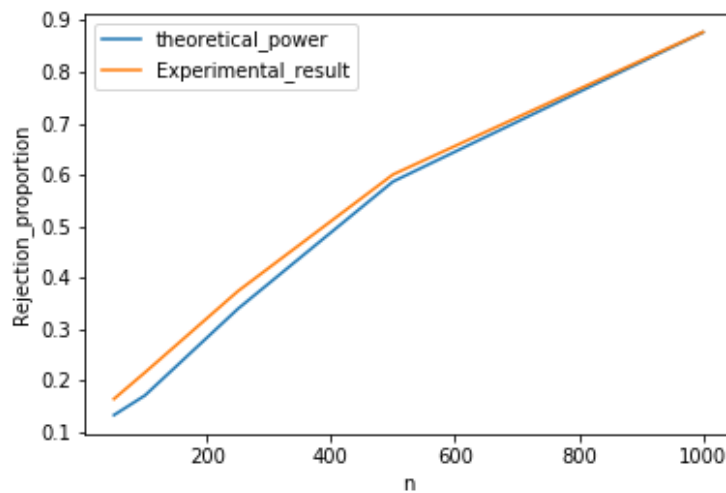
### Problem 1, Part 2



As the sample size increase we can see that Rejection Proportion approaches to 1.

### Problem 1, Part 3

Please refer to Notebook for theoretical explanation as it's written in LATEX.

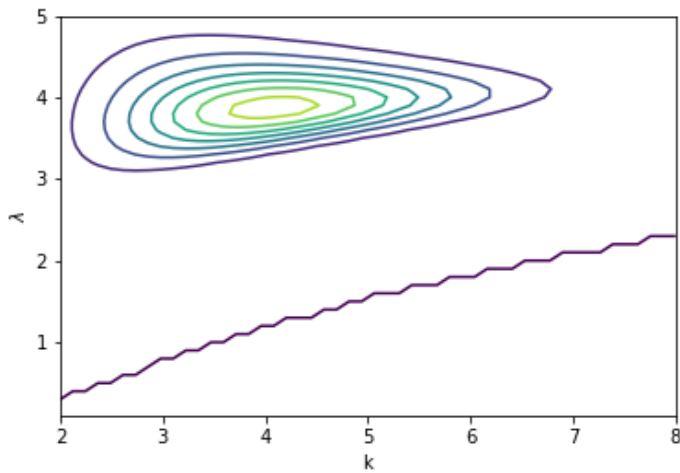


Theoretical Power is almost the same as what I have observed in experiment.

### Problem 2, Part 1

Please refer to Notebook for expression as it's written in LATEX and I can't copy them to WORD.

## Problem 2,Part 2



*Note : - I am not aware of the reason for the line in plot. I tried to figure it out but can't seem to figure out a reason for this behavior.*

## Problem 2, Part 3 and Part 4

**For X in range (3,6)**

### Results and Warning of the solver

Warning: Desired error not necessarily achieved due to precision loss.

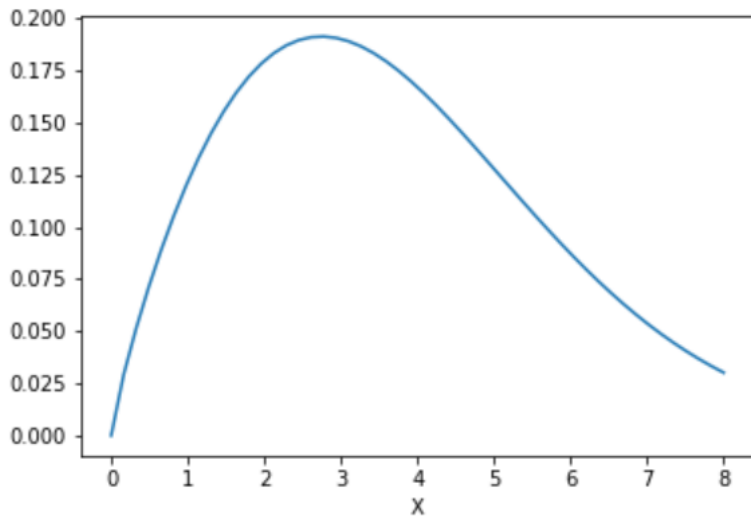
Current function value: -3.147914

Iterations: 3

Function evaluations: 98

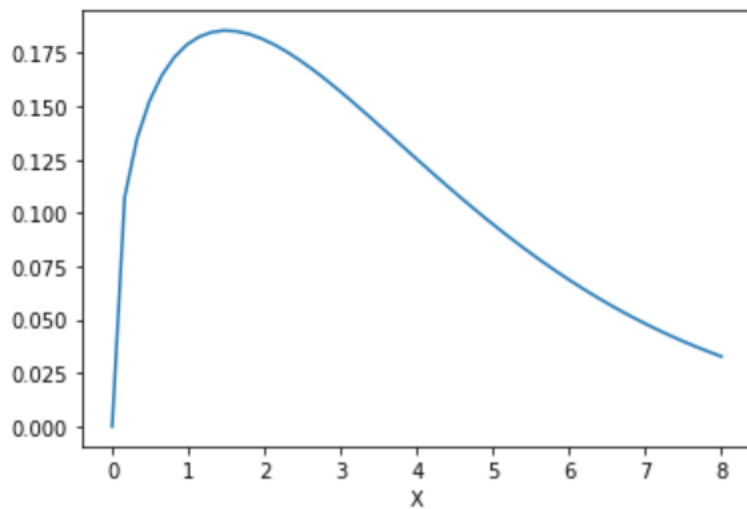
Gradient evaluations: 86

$k, \lambda = 1.8247438778440916 \ 4.242582359693068$



**For X in range (3,4)**

**Results and Warning of the solver**



Warning: Desired error not necessarily achieved due to precision loss.

Current function value: -3.383666

Iterations: 3

Function evaluations: 100

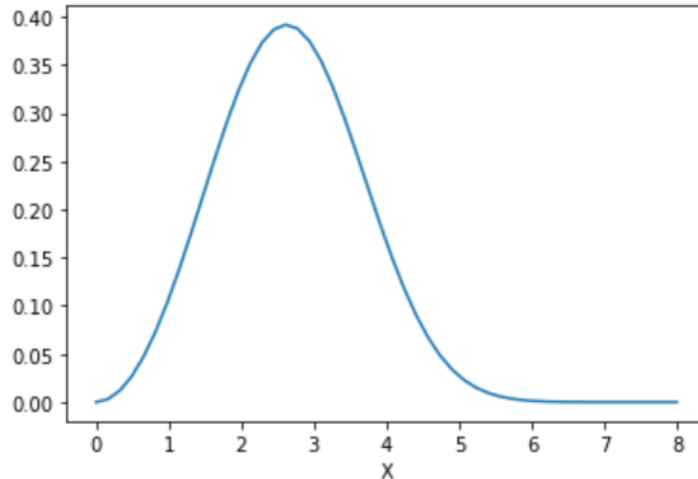
Gradient evaluations: 88

k,lamb = 1.3616844114019195 3.9583389843755326

**For X in range (3,3.1)**

### **Results and Warning of the solver**

```
Warning: Desired error not necessarily achieved due to precision loss.  
Current function value: -2.000202  
Iterations: 0  
Function evaluations: 106  
Gradient evaluations: 94  
k,lamb = 3.0 3.0
```



**I have used most of the solver available in `scipy.optimize.minimize` and none of them seems to be able to minimize the problem. 'BFGS' solver came close to actual result, so therefore I am reporting the result from that solver.**