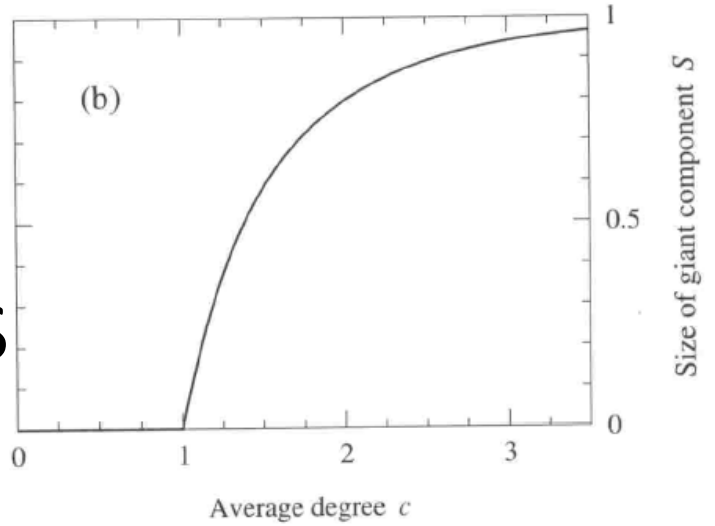
Quiz 11

Draw a curve of the size of the giant component in a random graph.

$$S = 1 - e^{-cS}$$

X axis : average degree c

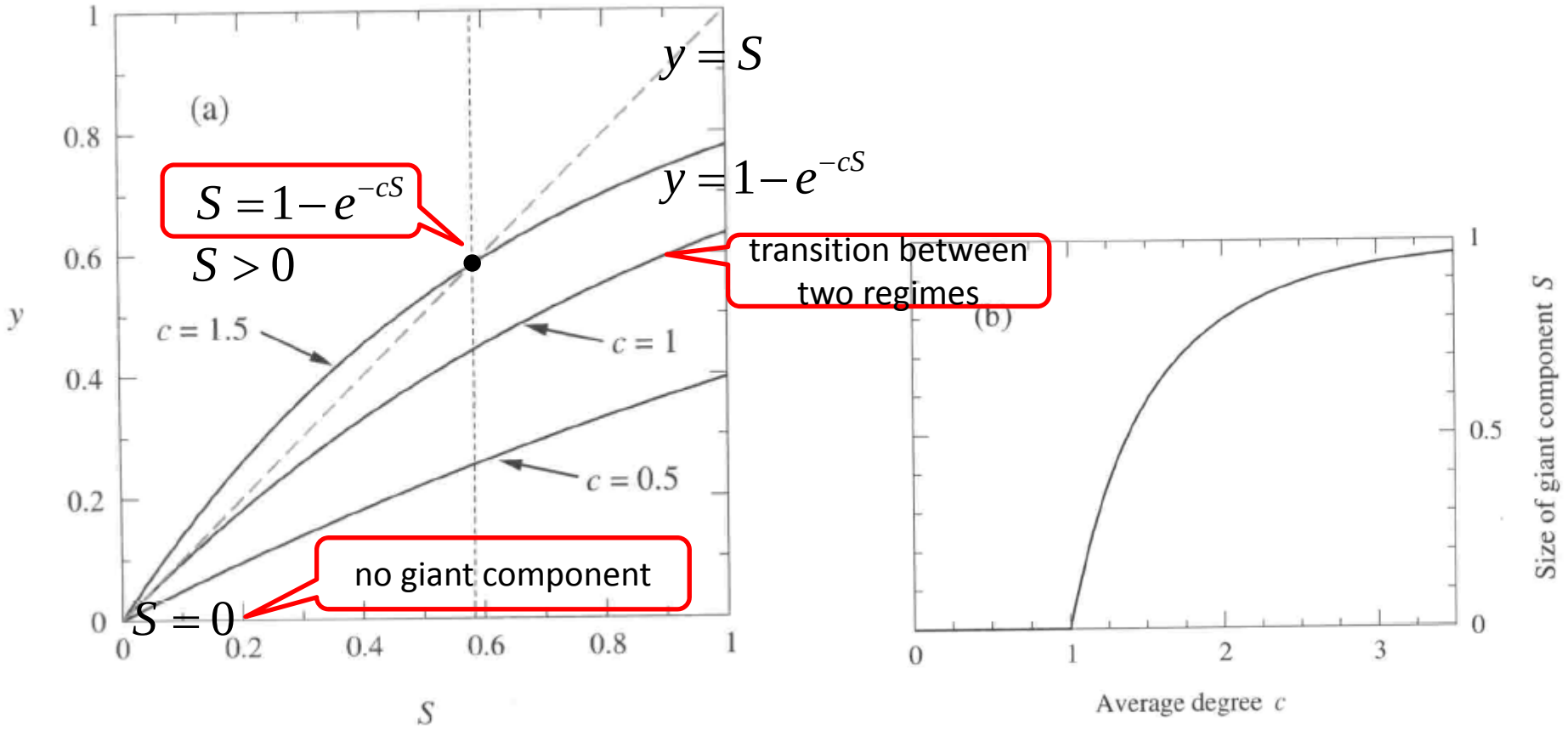
Y axis : size of giant component S



- Submit from Tokyo Tech OCW-i
- Deadline: ??:??(Japan Standard Time) on Jan. 23(Wed)
- Files should be MS Word, PDF or Zipped Jupyter notebook.

Size of giant component

- The fraction of vertices in the giant component S in a random network is $S = 1 - e^{-cS}$, where c is its mean degree. ($S - 1 + e^{-cS} = 0$)



Numerical solution of S=1-e^(-cS) (when c=-1.5) -> [0.58281164]

```
from scipy import optimize, exp
def f(x):
  return x-1+exp(-1.5*x)
print(optimize.newton(f,1)) #optimize from 1 (0 is another solution)
```

```
0.5828116438658114
```

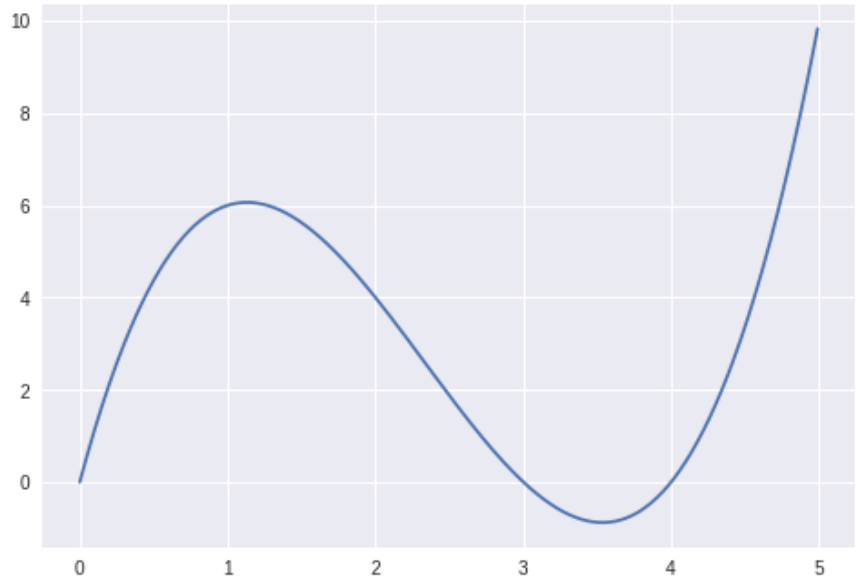
```
from scipy import optimize, exp
print(optimize.newton(lambda x: x-1+exp(-1.5*x), 1))
```

drawing graph of polynomial (y=x^3-7x^2+12x)

```
[44] import matplotlib.pyplot as plt

     x = range(500)
     y = [0] * 500
     for i in x:
       y[i] = (i/100)**3 - 7*(i/100)**2 + 12*(i/100) # y=x^3-7x^2+12x
     plt.plot(list(map(lambda x: x * 0.01, x)), y)
```

```
[<matplotlib.lines.Line2D at 0x7fee3da54b00>]
```




```
import matplotlib.pyplot as plt
from scipy import optimize, exp

x = range(500)
y = [0] * 500
for i in x:
  y[i] =
plt.plot(list(map(lambda x: x * 0.01, x)), y)
```