```python
# DS6 info.py

import matplotlib.pyplot as plt
import numpy as np


#Ex 4.1
def a(n):
    a=1
    for i in range(1,n):
        a=a*(1+a)/(1+2*a)
    return(a)

#Ex 4.2
def C(n):
    S=0
    for i in range(1,n):
        C=C+(1/a(n+1)-1/a(n))
    return(C/n)

#Ex 4.3
def P(t,X):
    return(X**5 +t *X -1)

def dichotomie(epsilon,t):
    a=0
    b=1
    while abs(a-b)>epsilon:
        c=(a+b)/2
        if P(t,c)>0:
            b=c
        else:
            a=c
    return(c)
#On prendra epsilon =10**(-3) pour avoir la précision demandée


#Ex 4.4
X= np.linspace(0,1,100)
Y=[dichotomie(10**(-3),t) for t in X]
plt.plot(X,Y)
plt.show()
```