

tri trapi gauss fit & plot

```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm

#define set A & its Membership vals
np.random.seed(42)
A=np.arange(1,11)
membership_A=np.random.rand(len(A))
#membership_A=np.random.rand(10)

#define tri trapi & gauss MFs
#triangular MF
def tri(x,a,b,c):
    return np.maximum(np.minimum((x-a)/(b-a),(c-x)/(c-b)),0)

#trapezoidal MF
def trapi(x,a,b,c,d):
    return np.maximum(np.minimum(np.minimum((x-a)/(b-a),1),(d-x)/(d-c)),0)

#gaussian MF
def gauss(x,mu,sigma):
    return norm.pdf(x,mu,sigma)

#define x(an array of random 1000 evenly spaced no.s, starting from 0 & ended at 11)
x=np.linspace(0,11,1000)
```

```
#main func(user defined)
```

```
#tri Mf parameters
```

```
#print("enter parameters for tri MF(a, b, c) sperated by spaces:")
```

```
#tri_params = list(map(float, input().split())) #list is mutable,tuple is immutable, here we dont need  
the mutable parameter as the no. of parames are fixed
```

```
tri_params = tuple(map(float, input("enter parameters for tri MF(a, b, c) sperated by  
spaces:").split())) #space-separated input string, splits it into individual components, converts each  
component to a float, and stores them in a list
```

```
#func call
```

```
tri_membership=tri(x,*tri_params)
```

```
#trapi Mf parameters
```

```
#print("\nenter parameters for trapi MF(a, b, c,d) sperated by spaces:")
```

```
trapi_params = tuple(map(float, input("\nenter parameters for trapi MF(a, b, c,d) sperated by  
spaces:").split()))
```

```
#func call
```

```
trapi_membership=trapi(x,*trapi_params)
```

```
#gauss Mf parameters
```

```
#print("\nenter parameters for gauss MF(mu,sigma) sperated by spaces:")
```

```
gauss_params = tuple(map(float, input("\nenter parameters for gauss MF(mu,sigma) sperated by  
spaces:").split()))
```

```
#func call
```

```
gauss_membership=gauss(x,*gauss_params)
```

```
#fit & plot tri trapi & gauss MF
```

```
#tri
```

```
plt.figure(figsize=(6,4))
```

```
plt.scatter(A,membership_A,color="red",zorder=5)
```

```
plt.plot(x,tri_membership,label="triangular")
```

```
plt.title("triangular MF")
```

```
plt.xlabel("x or A")
```

```
plt.ylabel("membership grades")
```

```
plt.legend()
```

```
plt.show()
```

```
#tri
```

```
plt.figure(figsize=(6,4))
```

```
plt.scatter(A,membership_A,color="red",zorder=5)
```

```
plt.plot(x,trapi_membership,label="trapizoidal")
```

```
plt.title("trapizoidal MF")
```

```
plt.xlabel("x or A")
```

```
plt.ylabel("membership grades")
```

```
plt.legend()
```

```
plt.show()
```

```
#tri
```

```
plt.figure(figsize=(6,4))
```

```
plt.scatter(A,membership_A,color="red",zorder=5)
```

```
plt.plot(x,gauss_membership,label="gauss")
```

```
plt.title("gauss MF")
```

```
plt.xlabel("x or A")
```

```
plt.ylabel("membership grades")
```

```
plt.legend()
```

```
plt.show()
```

enter parameters for tri MF(a, b, c) sperated by spaces: 2 5 8

enter parameters for trapi MF(a, b, c,d) sperated by spaces: 1 3 7 9

enter parameters for gauss MF(mu,sigma) sperated by spaces: 5 1.5

