

Introduction to fuzzy logic

إعداد :
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Fuzzy Sets

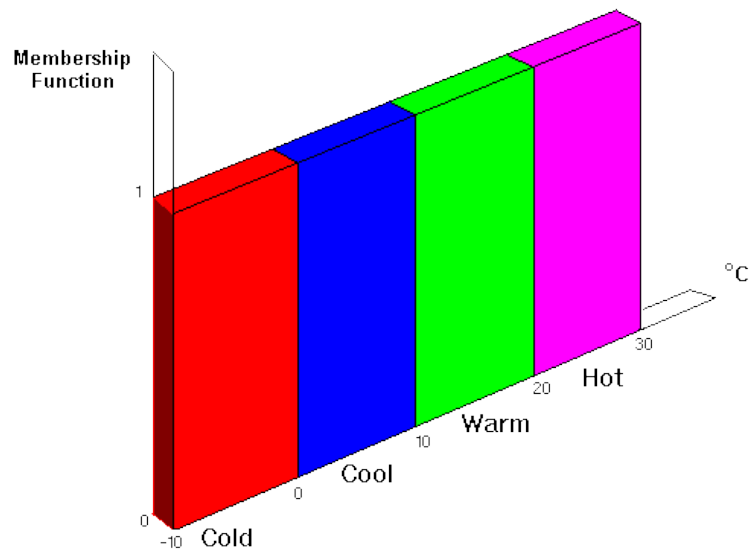


Fig. 1 : Bivalent Sets to Characterize the Temp. of a room.

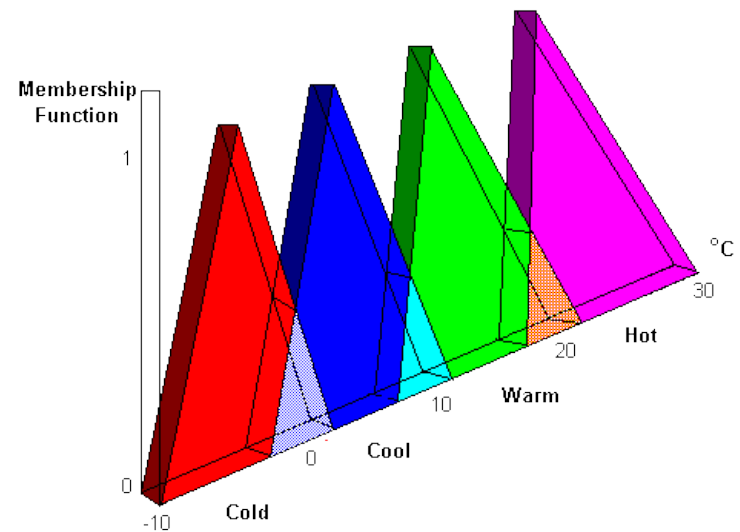
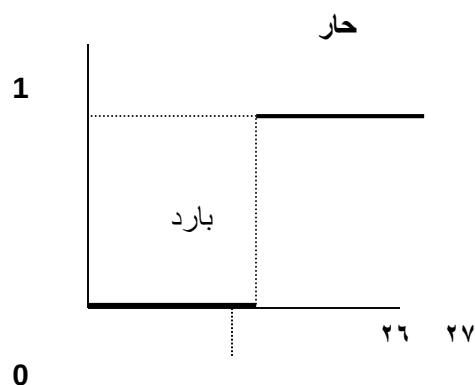


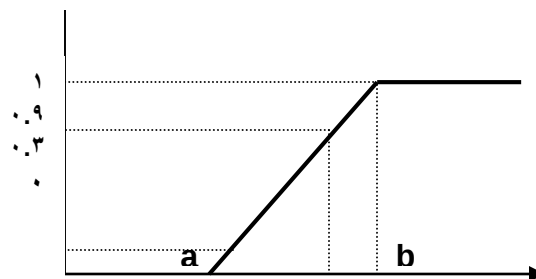
Fig. 2 - Fuzzy Sets to characterize the Temp. of a room.

Crisp sets V. Fuzzy sets



الشكل (٣)

المنطق التقليدي



الشكل (٢)

المنطق الضبابي

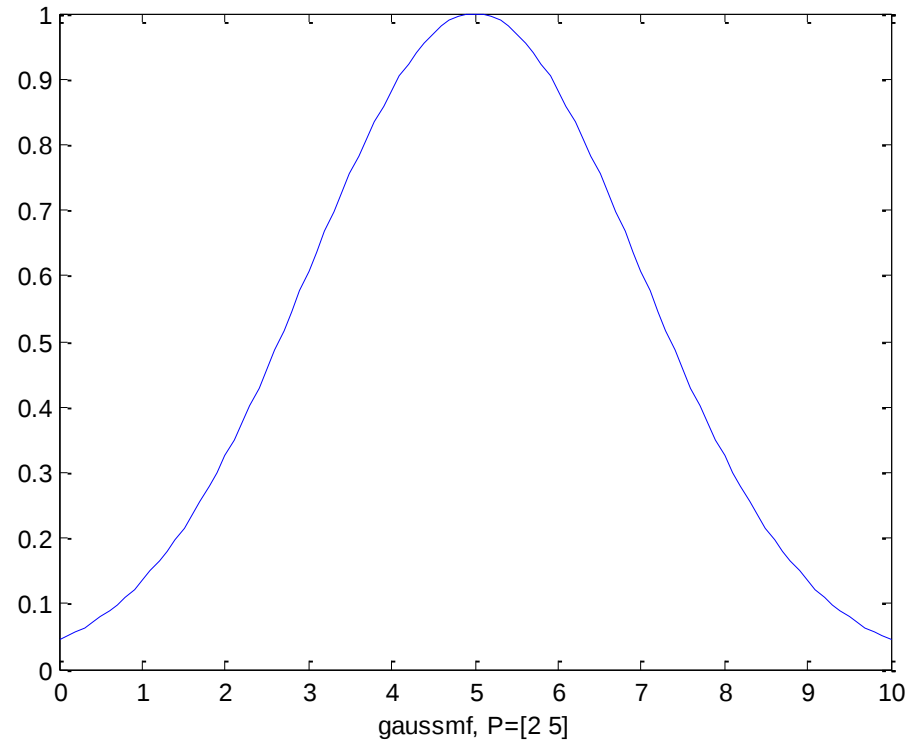
$$\chi_A : X \rightarrow \{0, 1\}.$$

$$\mu_A : X \rightarrow [0, 1].$$

**member أشهر أشكال
functions
gaussmf**

$\text{gaussmf}(x, [\text{sigma}, c]) = \exp(-(x - c).^2/(2*\text{sigma}^2));$

```
y = gaussmf(x,[sig c])  
x=0:0.1:10;  
y=gaussmf(x,[2 5]);  
plot(x,y)  
xlabel('gaussmf, P=[2 5]')
```

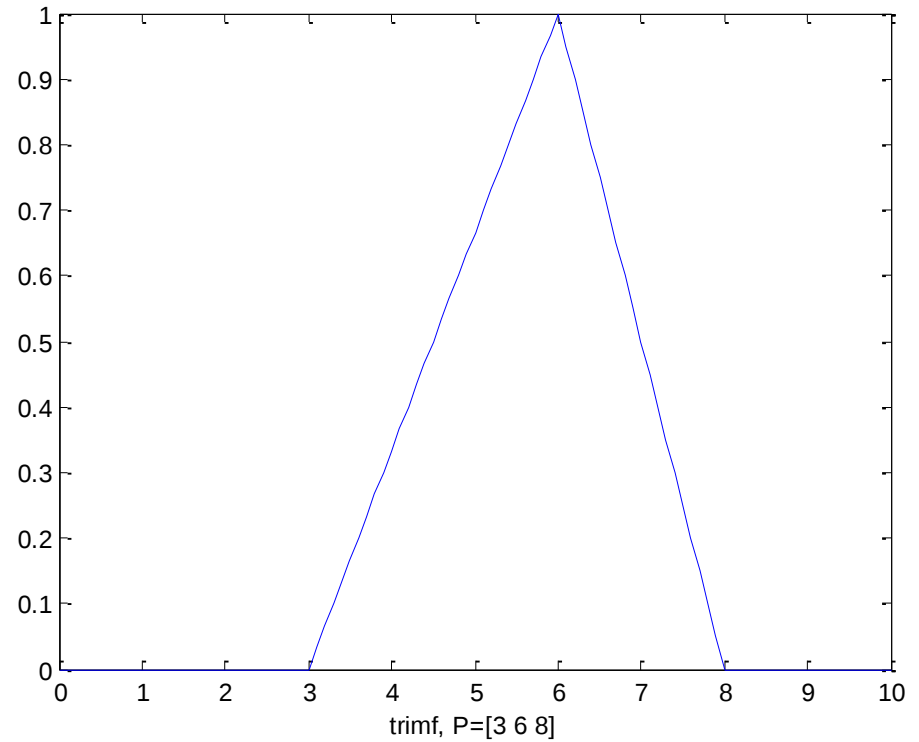


trimf

trimf(x, params)

$a \leq b \leq c$.

```
x=0:0.1:10;  
y=trimf(x,[3 6 8]);  
plot(x,y)  
xlabel('trimf, P=[3 6 8]')
```



trapmf

```
y = trapmf(x,[a b c d])
```

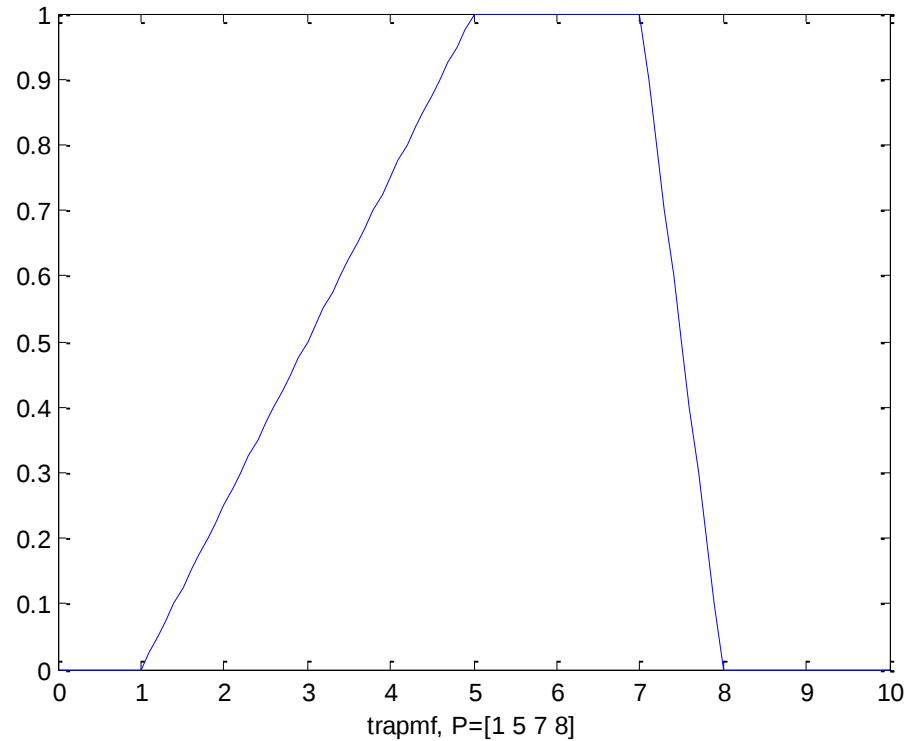
$a \leq b$ and $c \leq d$

```
x=0:0.1:10;
```

```
y=trapmf(x,[1 5 7 8]);
```

```
plot(x,y)
```

```
xlabel('trapmf, P=[1 5 7 8]')
```



Create new FIS

```
a=newfis(fisname)
```

```
a = addvar(a,varType,varName,varBounds)
```

```
a = addmf(a,varType,varIndex,mfName,mfType,mfParams)
```

```
a=newfis('tipper'); •
```

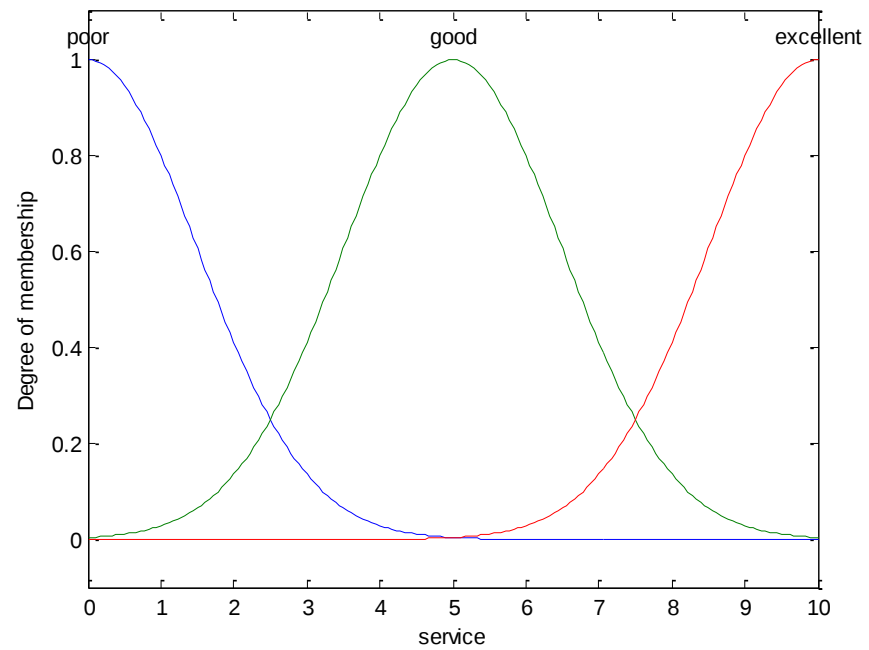
```
a=addvar(a,'input','service',[0 10]); •
```

```
a=addmf(a,'input',1,'poor','gaussmf',[1.5 0]); •
```

```
a=addmf(a,'input',1,'good','gaussmf',[1.5 5]); •
```

```
a=addmf(a,'input',1,'excellent','gaussmf',[1.5 10]); •
```

```
plotmf(a,'input',1) •
```



FUZZY GUI

