Table 3: Gaussian Membership Function, MATLAB Code

```
function gauss = gauss(x,c,d, h) %exponential function for defining
Membership Functions
    gauss=h*exp(-0.5*(((x-c)/d).^2));
end
```

Table 4: Interval Type _2 Fuzzy System MATLAB Code (Investigation 8), based on Uncertainty Avoider Defuzzification.

```
%%%Uncertainty Avoider based Interval T2 Fuzzy System MATLAB%%%
%%%%%%%%%%%%%%%%%code. two-input one-output fuzzy system%%%%%%%%%%%%%
%%%%%64 (16*4) rules are available%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%Each input and the output ranges are divided by 4 Gaussian MFs%

%x=2:0.287:30; %Sample data: A
%y=10:0.823:90; %Sample data: A
%%z=10:0.92:100; n=98 %Sample data: A
%n=98; %size of x and y %Sample data: A
%zz=-20:0.92:130; %range of z is [10 100]. it is extended to [10-30 100+30]=[-20 130] for not loosing the main range of z [10 100]
in output.
%n1=164; %size of zz (size of z is n same as x and y, but so far z is output, it is extended to zz for covering all z range in output)

%Applied data for investigation 8
x=2:0.8:30;  %Sample data: B
y=10:2.25:90;  %Sample data: B
%z=10:2.55:100; n=36 %Sample data: B
n=36; %size of x and y %Sample data: B
zz=-20:2.55:130; %range of z is [10 100]. it is extended to [10-30 100+30]=[-20 130] for not losing the main range of z [10 100] in
output.
n1=59;

%Range x=[2 30] 30-2=28  28/3=;9  x-2 x-11  x-20 x-30
x1=2;  %center of Gaussian MF
x2=11;  %center of Gaussian MF
x3=20;   %center of Gaussian MF
x4=30;  %center of Gaussian MF
%Range y=[10 95] 95-10=85 85/3=;28 y-10  y-38 y-66 y-95
y1=10;  %center of Gaussian MF
y2=38;  %center of Gaussian MF
y3=66;   %center of Gaussian MF
y4=95;  %center of Gaussian MF
%Range z=[10 100] 100-10=90  90/3=;30 z-10 z-40 z-70 z-100  left side from first peak=30:
%10-30=-20?  right side from last peak=30: 130-101
z1=10;  %center of Gaussian MF
z2=40;  %center of Gaussian MF
z3=70;  %center of Gaussian MF
z4=100;  %center of Gaussian MF

%calling fm function for describing Membership Functions
%function mf = gauss(x,c,d,h) %exponential function for defining Membership
%%%Functions c=center of Gaussian MF, d=the width  h=height of MF
%   mf=h*exp(-0.5*(((x-c)/d).^2));
%end

for i=1:n; %x upper MF= UPM
 mf1xu(i)=gauss(x(i),x1,3,1);
 mf2xu(i)=gauss(x(i),x2,3,1);
 mf3xu(i)=gauss(x(i),x3,3,1);
 mf4xu(i)=gauss(x(i),x4,3,1);
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% x lower MF= LMF
 mf1xl(i)=gauss(x(i),x1,1.5,0.8);
 mf2xl(i)=gauss(x(i),x2,1.5,0.8);
 mf3xl(i)=gauss(x(i),x3,1.5,0.8);
 mf4xl(i)=gauss(x(i),x4,1.5,0.8);
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% y upper MF=UMF
 mf1yu(i)=gauss(y(i),y1,7,1);
 mf2yu(i)=gauss(y(i),y2,7,1);
```

```matlab
  mf3yu(i)=gauss(y(i),y3,7,1);
  mf4yu(i)=gauss(y(i),y4,7,1);
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% y lower MF=LMF
 mf1yl(i)=gauss(y(i),y1,3.5,0.8);
 mf2yl(i)=gauss(y(i),y2,3.5,0.8);
 mf3yl(i)=gauss(y(i),y3,3.5,0.8);
 mf4yl(i)=gauss(y(i),y4,3.5,0.8);
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
end

fori=1:n1; %z upper MF= UMF
 mf1zu(i)=gauss(zz(i),z1,9,1);
 mf2zu(i)=gauss(zz(i),z2,9,1);
 mf3zu(i)=gauss(zz(i),z3,9,1);
 mf4zu(i)=gauss(zz(i),z4,9,1);
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% z lower MF=LMF
 mf1zl(i)=gauss(zz(i),z1,4.5,0.8);
 mf2zl(i)=gauss(zz(i),z2,4.5,0.8);
 mf3zl(i)=gauss(zz(i),z3,4.5,0.8);
 mf4zl(i)=gauss(zz(i),z4,4.5,0.8);
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
end
%Combination of antecedents of upper and lower MFs of all Inputs
fori=1:n;
for j=1:n;
    mf11u(i,j)= min(mf1xu(i),mf1yu(j)); %Antecedent 11u
    mf12u(i,j)= min(mf1xu(i),mf2yu(j)); %Antecedent 12u
    mf13u(i,j)= min(mf1xu(i),mf3yu(j)); %Antecedent 13u
    mf14u(i,j)= min(mf1xu(i),mf4yu(j)); %Antecedent 14u

    mf21u(i,j)= min(mf2xu(i),mf1yu(j)); %Antecedent 21u
    mf22u(i,j)= min(mf2xu(i),mf2yu(j)); %Antecedent 22u
    mf23u(i,j)= min(mf2xu(i),mf3yu(j)); %Antecedent 23u
    mf24u(i,j)= min(mf2xu(i),mf4yu(j)); %Antecedent 24u

    mf31u(i,j)= min(mf3xu(i),mf1yu(j)); %Antecedent 31u
    mf32u(i,j)= min(mf3xu(i),mf2yu(j)); %Antecedent 32u
    mf33u(i,j)= min(mf3xu(i),mf3yu(j)); %Antecedent 33u
    mf34u(i,j)= min(mf3xu(i),mf4yu(j)); %Antecedent 34u

    mf41u(i,j)= min(mf4xu(i),mf1yu(j)); %Antecedent 31u
    mf42u(i,j)= min(mf4xu(i),mf2yu(j)); %Antecedent 32u
    mf43u(i,j)= min(mf4xu(i),mf3yu(j)); %Antecedent 33u
    mf44u(i,j)= min(mf4xu(i),mf4yu(j)); %Antecedent 34u

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
    mf11l(i,j)= min(mf1xl(i),mf1yl(j)); %Antecedent 11l
    mf12l(i,j)= min(mf1xl(i),mf2yl(j)); %Antecedent 12l
    mf13l(i,j)= min(mf1xl(i),mf3yl(j)); %Antecedent 13l
    mf14l(i,j)= min(mf1xl(i),mf4yl(j)); %Antecedent 14l

    mf21l(i,j)= min(mf2xl(i),mf1yl(j)); %Antecedent 21l
    mf22l(i,j)= min(mf2xl(i),mf2yl(j)); %Antecedent 22l
    mf23l(i,j)= min(mf2xl(i),mf3yl(j)); %Antecedent 23l
    mf24l(i,j)= min(mf2xl(i),mf4yl(j)); %Antecedent 24l

    mf31l(i,j)= min(mf3xl(i),mf1yl(j)); %Antecedent 31l
    mf32l(i,j)= min(mf3xl(i),mf2yl(j)); %Antecedent 32l
    mf33l(i,j)= min(mf3xl(i),mf3yl(j)); %Antecedent 33l
    mf34l(i,j)= min(mf3xl(i),mf4yl(j)); %Antecedent 34l

    mf41l(i,j)= min(mf4xl(i),mf1yl(j)); %Antecedent 31l
    mf42l(i,j)= min(mf4xl(i),mf2yl(j)); %Antecedent 32l
    mf43l(i,j)= min(mf4xl(i),mf3yl(j)); %Antecedent 33l
    mf44l(i,j)= min(mf4xl(i),mf4yl(j)); %Antecedent 34l

end
end
%Reshaping of all antecedent combinations
mf11uVector=reshape(mf11u,1,[]);
mf11lVector=reshape(mf11l,1,[]);
mf12uVector=reshape(mf12u,1,[]);
mf12lVector=reshape(mf12l,1,[]);
mf13uVector=reshape(mf13u,1,[]);
mf13lVector=reshape(mf13l,1,[]);
```

```matlab
mf14uVector=reshape(mf14u,1,[]);
mf14lVector=reshape(mf14l,1,[]);

mf21uVector=reshape(mf21u,1,[]);
mf21lVector=reshape(mf21l,1,[]);
mf22uVector=reshape(mf22u,1,[]);
mf22lVector=reshape(mf22l,1,[]);
mf23uVector=reshape(mf23u,1,[]);
mf23lVector=reshape(mf23l,1,[]);
mf24uVector=reshape(mf24u,1,[]);
mf24lVector=reshape(mf24l,1,[]);

mf31uVector=reshape(mf31u,1,[]);
mf31lVector=reshape(mf31l,1,[]);
mf32uVector=reshape(mf32u,1,[]);
mf32lVector=reshape(mf32l,1,[]);
mf33uVector=reshape(mf33u,1,[]);
mf33lVector=reshape(mf33l,1,[]);
mf34uVector=reshape(mf34u,1,[]);
mf34lVector=reshape(mf34l,1,[]);

mf41uVector=reshape(mf41u,1,[]);
mf41lVector=reshape(mf41l,1,[]);
mf42uVector=reshape(mf42u,1,[]);
mf42lVector=reshape(mf42l,1,[]);
mf43uVector=reshape(mf43u,1,[]);
mf43lVector=reshape(mf43l,1,[]);
mf44uVector=reshape(mf44u,1,[]);
mf44lVector=reshape(mf44l,1,[]);

%IF Then: Output MFS
fori=1:n*n;
for j=1:n1; %UPPER UMF
    outR111u(i,j)=min(mf11uVector(i),mf1zu(j));
    outR112u(i,j)=min(mf11uVector(i),mf2zu(j));
    outR113u(i,j)=min(mf11uVector(i),mf3zu(j));
    outR114u(i,j)=min(mf11uVector(i),mf4zu(j));

    outR121u(i,j)=min(mf12uVector(i),mf1zu(j));
    outR122u(i,j)=min(mf12uVector(i),mf2zu(j));
    outR123u(i,j)=min(mf12uVector(i),mf3zu(j));
    outR124u(i,j)=min(mf12uVector(i),mf4zu(j));

    outR131u(i,j)=min(mf13uVector(i),mf1zu(j));
    outR132u(i,j)=min(mf13uVector(i),mf2zu(j));
    outR133u(i,j)=min(mf13uVector(i),mf3zu(j));
    outR134u(i,j)=min(mf13uVector(i),mf4zu(j));

    outR141u(i,j)=min(mf14uVector(i),mf1zu(j));
    outR142u(i,j)=min(mf14uVector(i),mf2zu(j));
    outR143u(i,j)=min(mf14uVector(i),mf3zu(j));
    outR144u(i,j)=min(mf14uVector(i),mf4zu(j));

    outR211u(i,j)=min(mf21uVector(i),mf1zu(j));
    outR212u(i,j)=min(mf21uVector(i),mf2zu(j));
    outR213u(i,j)=min(mf21uVector(i),mf3zu(j));
    outR214u(i,j)=min(mf21uVector(i),mf4zu(j));

    outR221u(i,j)=min(mf22uVector(i),mf1zu(j));
    outR222u(i,j)=min(mf22uVector(i),mf2zu(j));
    outR223u(i,j)=min(mf22uVector(i),mf3zu(j));
    outR224u(i,j)=min(mf22uVector(i),mf4zu(j));

    outR231u(i,j)=min(mf23uVector(i),mf1zu(j));
    outR232u(i,j)=min(mf23uVector(i),mf2zu(j));
    outR233u(i,j)=min(mf23uVector(i),mf3zu(j));
    outR234u(i,j)=min(mf23uVector(i),mf4zu(j));

    outR241u(i,j)=min(mf24uVector(i),mf1zu(j));
    outR242u(i,j)=min(mf24uVector(i),mf2zu(j));
    outR243u(i,j)=min(mf24uVector(i),mf3zu(j));
    outR244u(i,j)=min(mf24uVector(i),mf4zu(j));

    outR311u(i,j)=min(mf31uVector(i),mf1zu(j));
    outR312u(i,j)=min(mf31uVector(i),mf2zu(j));
```

```
outR313u(i,j)=min(mf31uVector(i),mf3zu(j));
outR314u(i,j)=min(mf31uVector(i),mf4zu(j));

outR321u(i,j)=min(mf32uVector(i),mf1zu(j));
outR322u(i,j)=min(mf32uVector(i),mf2zu(j));
outR323u(i,j)=min(mf32uVector(i),mf3zu(j));
outR324u(i,j)=min(mf32uVector(i),mf4zu(j));

outR331u(i,j)=min(mf33uVector(i),mf1zu(j));
outR332u(i,j)=min(mf33uVector(i),mf2zu(j));
outR333u(i,j)=min(mf33uVector(i),mf3zu(j));
outR334u(i,j)=min(mf33uVector(i),mf4zu(j));

outR341u(i,j)=min(mf34uVector(i),mf1zu(j));
outR342u(i,j)=min(mf34uVector(i),mf2zu(j));
outR343u(i,j)=min(mf34uVector(i),mf3zu(j));
outR344u(i,j)=min(mf34uVector(i),mf4zu(j));

outR411u(i,j)=min(mf41uVector(i),mf1zu(j));
outR412u(i,j)=min(mf41uVector(i),mf2zu(j));
outR413u(i,j)=min(mf41uVector(i),mf3zu(j));
outR414u(i,j)=min(mf41uVector(i),mf4zu(j));

outR421u(i,j)=min(mf42uVector(i),mf1zu(j));
outR422u(i,j)=min(mf42uVector(i),mf2zu(j));
outR423u(i,j)=min(mf42uVector(i),mf3zu(j));
outR424u(i,j)=min(mf42uVector(i),mf4zu(j));

outR431u(i,j)=min(mf43uVector(i),mf1zu(j));
outR432u(i,j)=min(mf43uVector(i),mf2zu(j));
outR433u(i,j)=min(mf43uVector(i),mf3zu(j));
outR434u(i,j)=min(mf43uVector(i),mf4zu(j));

outR441u(i,j)=min(mf44uVector(i),mf1zu(j));
outR442u(i,j)=min(mf44uVector(i),mf2zu(j));
outR443u(i,j)=min(mf44uVector(i),mf3zu(j));
outR444u(i,j)=min(mf44uVector(i),mf4zu(j));

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%LOWER LMF
outR111l(i,j)=min(mf11lVector(i),mf1zl(j));
outR112l(i,j)=min(mf11lVector(i),mf2zl(j));
outR113l(i,j)=min(mf11lVector(i),mf3zl(j));
outR114l(i,j)=min(mf11lVector(i),mf4zl(j));

outR121l(i,j)=min(mf12lVector(i),mf1zl(j));
outR122l(i,j)=min(mf12lVector(i),mf2zl(j));
outR123l(i,j)=min(mf12lVector(i),mf3zl(j));
outR124l(i,j)=min(mf12lVector(i),mf4zl(j));

outR131l(i,j)=min(mf13lVector(i),mf1zl(j));
outR132l(i,j)=min(mf13lVector(i),mf2zl(j));
outR133l(i,j)=min(mf13lVector(i),mf3zl(j));
outR134l(i,j)=min(mf13lVector(i),mf4zl(j));

outR141l(i,j)=min(mf14lVector(i),mf1zl(j));
outR142l(i,j)=min(mf14lVector(i),mf2zl(j));
outR143l(i,j)=min(mf14lVector(i),mf3zl(j));
outR144l(i,j)=min(mf14lVector(i),mf4zl(j));

outR211l(i,j)=min(mf21lVector(i),mf1zl(j));
outR212l(i,j)=min(mf21lVector(i),mf2zl(j));
outR213l(i,j)=min(mf21lVector(i),mf3zl(j));
outR214l(i,j)=min(mf21lVector(i),mf4zl(j));

outR221l(i,j)=min(mf22lVector(i),mf1zl(j));
outR222l(i,j)=min(mf22lVector(i),mf2zl(j));
outR223l(i,j)=min(mf22lVector(i),mf3zl(j));
outR224l(i,j)=min(mf22lVector(i),mf4zl(j));

outR231l(i,j)=min(mf23lVector(i),mf1zl(j));
outR232l(i,j)=min(mf23lVector(i),mf2zl(j));
outR233l(i,j)=min(mf23lVector(i),mf3zl(j));
outR234l(i,j)=min(mf23lVector(i),mf4zl(j));

outR241l(i,j)=min(mf24lVector(i),mf1zl(j));
```

```matlab
    outR242l(i,j)=min(mf24lVector(i),mf2zl(j));
    outR243l(i,j)=min(mf24lVector(i),mf3zl(j));
    outR244l(i,j)=min(mf24lVector(i),mf4zl(j));

    outR311l(i,j)=min(mf31lVector(i),mf1zl(j));
    outR312l(i,j)=min(mf31lVector(i),mf2zl(j));
    outR313l(i,j)=min(mf31lVector(i),mf3zl(j));
    outR314l(i,j)=min(mf31lVector(i),mf4zl(j));

    outR321l(i,j)=min(mf32lVector(i),mf1zl(j));
    outR322l(i,j)=min(mf32lVector(i),mf2zl(j));
    outR323l(i,j)=min(mf32lVector(i),mf3zl(j));
    outR324l(i,j)=min(mf32lVector(i),mf4zl(j));

    outR331l(i,j)=min(mf33lVector(i),mf1zl(j));
    outR332l(i,j)=min(mf33lVector(i),mf2zl(j));
    outR333l(i,j)=min(mf33lVector(i),mf3zl(j));
    outR334l(i,j)=min(mf33lVector(i),mf4zl(j));

    outR341l(i,j)=min(mf34lVector(i),mf1zl(j));
    outR342l(i,j)=min(mf34lVector(i),mf2zl(j));
    outR343l(i,j)=min(mf34lVector(i),mf3zl(j));
    outR344l(i,j)=min(mf34lVector(i),mf4zl(j));

    outR411l(i,j)=min(mf41lVector(i),mf1zl(j));
    outR412l(i,j)=min(mf41lVector(i),mf2zl(j));
    outR413l(i,j)=min(mf41lVector(i),mf3zl(j));
    outR414l(i,j)=min(mf41lVector(i),mf4zl(j));

    outR421l(i,j)=min(mf42lVector(i),mf1zl(j));
    outR422l(i,j)=min(mf42lVector(i),mf2zl(j));
    outR423l(i,j)=min(mf42lVector(i),mf3zl(j));
    outR424l(i,j)=min(mf42lVector(i),mf4zl(j));

    outR431l(i,j)=min(mf43lVector(i),mf1zl(j));
    outR432l(i,j)=min(mf43lVector(i),mf2zl(j));
    outR433l(i,j)=min(mf43lVector(i),mf3zl(j));
    outR434l(i,j)=min(mf43lVector(i),mf4zl(j));

    outR441l(i,j)=min(mf44lVector(i),mf1zl(j));
    outR442l(i,j)=min(mf44lVector(i),mf2zl(j));
    outR443l(i,j)=min(mf44lVector(i),mf3zl(j));
    outR444l(i,j)=min(mf44lVector(i),mf4zl(j));

end
end
%Dedicating the Power of rules by filling Matrix named Power in range(0-1)
%PR111N=1; PR112N=0; PR113N=0; PR114N=0; PR121N=0; PR122N=1; PR123N=0; PR124N=0; PR131N=0; PR132N=0;
PR133N=1; PR134N=0; PR141N=1; PR142N=0; PR143N=0; PR144N=0;PR211N=0; PR212N=1; PR213N=0;
PR214N=0;PR221N=0; PR222N=0; PR223N=1; PR224N=0;PR231N=0; PR232N=0; PR233N=0; PR234N=1;PR241N=0;
PR242N=0; PR243N=0; PR244N=1;PR311N=1; PR312N=0; PR313N=0; PR314N=0;PR321N=0; PR322N=1; PR323N=0;
PR324N=0;PR331N=1; PR332N=0; PR333N=0; PR334N=0;PR341N=0; PR342N=0; PR343N=0; PR344N=1;PR411N=0;
PR412N=0; PR413N=0; PR414N=1;PR421N=0; PR422N=0; PR423N=0; PR424N=1; PR431N=0; PR432N=0; PR433N=1;
PR434N=0; PR441N=0; PR442N=0; PR443N=0; PR444N=1;
PR111N=0; PR112N=0; PR113N=0; PR114N=1; PR121N=0; PR122N=0; PR123N=0; PR124N=1; PR131N=0; PR132N=0;
PR133N=0; PR134N=1; PR141N=0; PR142N=0; PR143N=0; PR144N=1;PR211N=0; PR212N=0; PR213N=0;
PR214N=1;PR221N=1; PR222N=0; PR223N=0; PR224N=0;PR231N=1; PR232N=0; PR233N=0; PR234N=0;PR241N=0;
PR242N=0; PR243N=0; PR244N=1;PR311N=0; PR312N=0; PR313N=0; PR314N=1;PR321N=1; PR322N=0; PR323N=0;
PR324N=0;PR331N=1; PR332N=0; PR333N=0; PR334N=0;PR341N=0; PR342N=0; PR343N=0; PR344N=1;PR411N=0;
PR412N=0; PR413N=0; PR414N=1;PR421N=0; PR422N=0; PR423N=0; PR424N=1; PR431N=0; PR432N=0; PR433N=0;
PR434N=1; PR441N=0; PR442N=0; PR443N=0; PR444N=1;
Power=[PR111N, PR112N, PR113N, PR114N, PR121N, PR122N, PR123N, PR124N, PR131N, PR132N, PR133N, PR134N,
PR141N, PR142N, PR143N, PR144N,PR211N, PR212N, PR213N, PR214N,PR221N, PR222N, PR223N, PR224N,PR231N,
PR232N, PR233N, PR234N,PR241N, PR242N, PR243N, PR244N,PR311N, PR312N, PR313N, PR314N,PR321N, PR322N,
PR323N, PR324N,PR331N, PR332N, PR333N, PR334N,PR341N, PR342N, PR343N, PR344N,PR411N, PR412N, PR413N,
PR414N,PR421N, PR422N, PR423N, PR424N,PR431N, PR432N, PR433N, PR434N,PR441N, PR442N, PR443N, PR444N];
%Aggregation
fori=1:n*n,
for j=1:n1,
    UMF1(i,j)=max(PR444N*outR444u(i,j), max(PR443N*outR443u(i,j), max(PR442N*outR442u(i,j),
max(PR441N*outR441u(i,j),max(PR434N*outR434u(i,j), max(PR433N*outR433u(i,j), max(PR432N*outR432u(i,j),
max(PR431N*outR431u(i,j),max(PR424N*outR424u(i,j), max(PR423N*outR423u(i,j), max(PR422N*outR422u(i,j),
max(PR421N*outR421u(i,j),max(PR414N*outR414u(i,j), max(PR413N*outR413u(i,j), max(PR412N*outR412u(i,j),
PR411N*outR411u(i,j)))))))))))))))));
    UMF2(i,j)=max(PR344N*outR344u(i,j), max(PR343N*outR343u(i,j), max(PR342N*outR342u(i,j),
```

```matlab
max(PR341N*outR341u(i,j),max(PR334N*outR334u(i,j), max(PR333N*outR333u(i,j), max(PR332N*outR332u(i,j),
max(PR331N*outR331u(i,j),max(PR324N*outR324u(i,j), max(PR323N*outR323u(i,j), max(PR322N*outR322u(i,j),
max(PR321N*outR321u(i,j),max(PR314N*outR314u(i,j), max(PR313N*outR313u(i,j), max(PR312N*outR312u(i,j),
PR311N*outR311u(i,j)))))))))))))))));
      UMF3(i,j)=max(PR244N*outR244u(i,j), max(PR243N*outR243u(i,j), max(PR242N*outR242u(i,j),
max(PR241N*outR241u(i,j),max(PR234N*outR234u(i,j), max(PR233N*outR233u(i,j), max(PR232N*outR232u(i,j),
max(PR231N*outR231u(i,j),max(PR224N*outR224u(i,j), max(PR223N*outR223u(i,j), max(PR222N*outR222u(i,j),
max(PR221N*outR221u(i,j),max(PR214N*outR214u(i,j), max(PR213N*outR213u(i,j), max(PR212N*outR212u(i,j),
PR211N*outR211u(i,j)))))))))))))))));
      UMF4(i,j)=max(PR144N*outR144u(i,j), max(PR143N*outR143u(i,j), max(PR142N*outR142u(i,j),
max(PR141N*outR141u(i,j),max(PR134N*outR134u(i,j), max(PR133N*outR133u(i,j), max(PR132N*outR132u(i,j),
max(PR131N*outR131u(i,j),max(PR124N*outR124u(i,j), max(PR123N*outR123u(i,j), max(PR122N*outR122u(i,j),
max(PR121N*outR121u(i,j), max(PR114N*outR114u(i,j),max(PR113N*outR113u(i,j), max(PR112N*outR112u(i,j),
PR111N*outR111u(i,j)))))))))))))))));

      LMF1(i,j)=max(PR444N*outR444l(i,j), max(PR443N*outR443l(i,j), max(PR442N*outR442l(i,j),
max(PR441N*outR441l(i,j),max(PR434N*outR434l(i,j), max(PR433N*outR433l(i,j), max(PR432N*outR432l(i,j),
max(PR431N*outR431l(i,j),max(PR424N*outR424l(i,j), max(PR423N*outR423l(i,j), max(PR422N*outR422l(i,j),
max(PR421N*outR421l(i,j),max(PR414N*outR414l(i,j), max(PR413N*outR413l(i,j), max(PR412N*outR412l(i,j),
PR411N*outR411l(i,j)))))))))))))))));
      LMF2(i,j)=max(PR344N*outR344l(i,j), max(PR343N*outR343l(i,j), max(PR342N*outR342l(i,j),
max(PR341N*outR341l(i,j),max(PR334N*outR334l(i,j), max(PR333N*outR333l(i,j), max(PR332N*outR332l(i,j),
max(PR331N*outR331l(i,j),max(PR324N*outR324l(i,j), max(PR323N*outR323l(i,j), max(PR322N*outR322l(i,j),
max(PR321N*outR321l(i,j),max(PR314N*outR314l(i,j), max(PR313N*outR313l(i,j), max(PR312N*outR312l(i,j),
PR311N*outR311l(i,j)))))))))))))))));
      LMF3(i,j)=max(PR244N*outR244l(i,j), max(PR243N*outR243l(i,j), max(PR242N*outR242l(i,j),
max(PR241N*outR241l(i,j),max(PR234N*outR234l(i,j), max(PR233N*outR233l(i,j), max(PR232N*outR232l(i,j),
max(PR231N*outR231l(i,j),max(PR224N*outR224l(i,j), max(PR223N*outR223l(i,j), max(PR222N*outR222l(i,j),
max(PR221N*outR221l(i,j),max(PR214N*outR214l(i,j), max(PR213N*outR213l(i,j), max(PR212N*outR212l(i,j),
PR211N*outR211l(i,j)))))))))))))))));
      LMF4(i,j)=max(PR144N*outR144l(i,j), max(PR143N*outR143l(i,j), max(PR142N*outR142l(i,j),
max(PR141N*outR141l(i,j),max(PR134N*outR134l(i,j), max(PR133N*outR133l(i,j), max(PR132N*outR132l(i,j),
max(PR131N*outR131l(i,j),max(PR124N*outR124l(i,j), max(PR123N*outR123l(i,j), max(PR122N*outR122l(i,j),
max(PR121N*outR121l(i,j),max(PR114N*outR114l(i,j), max(PR113N*outR113l(i,j), max(PR112N*outR112l(i,j),
PR111N*outR111l(i,j)))))))))))))))));

end
end
for i =1:n*n,
for j=1:n1;
    UMF(i,j)=max(UMF1(i,j), max(UMF2(i,j), max(UMF3(i,j),UMF4(i,j))));
    LMF(i,j)=max(LMF1(i,j), max(LMF2(i,j), max(LMF3(i,j), LMF4(i,j))));
end
end

fori=1:n*n,
for j=1:n1;
    PMF(i,j)=UMF(i,j)+LMF(i,j);
end
end

%Decisiveness Method
fori=1:n*n;
for j=1:n1;
   DMF(i,j)=((UMF(i,j)+LMF(i,j))/2)-0.5*(UMF(i,j)-LMF(i,j)).^2;
end
end
%Defuzzification of DMF IT2FS
fori=1:n*n;      %Defuzzification
o2(i)=defuzz(zz,DMF(i,:),'centroid');
end

%Defuzzification of PMF T1FS
%for i=1:n*n;      %Defuzzification
%o2(i)=defuzz(zz,DMF(i,:),'centroid');
%end
% Output Surface
%plot(zz,o2, '*')
Bt=reshape(o2,[n,n]);
surf(x,y,Bt)
```