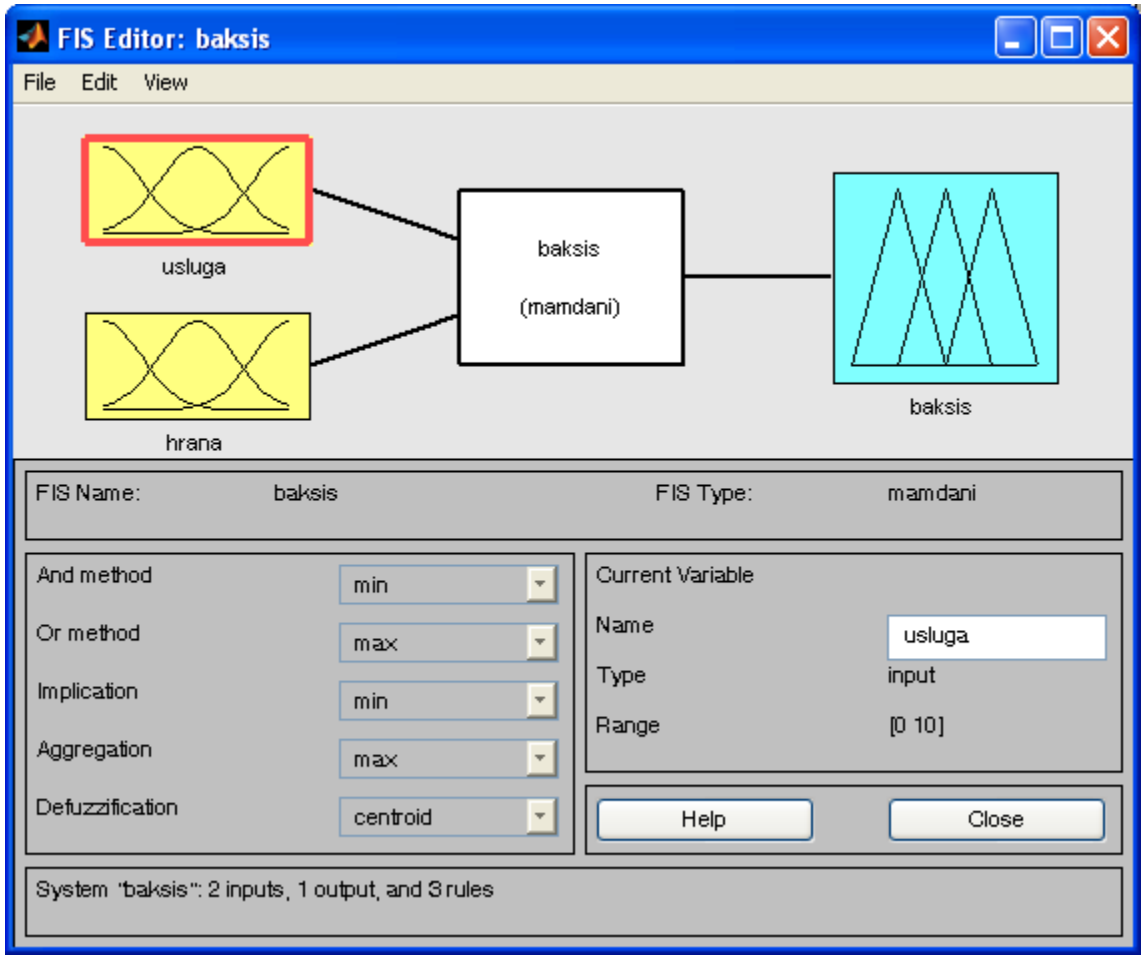
Primer: Bakšiš - Mamdani

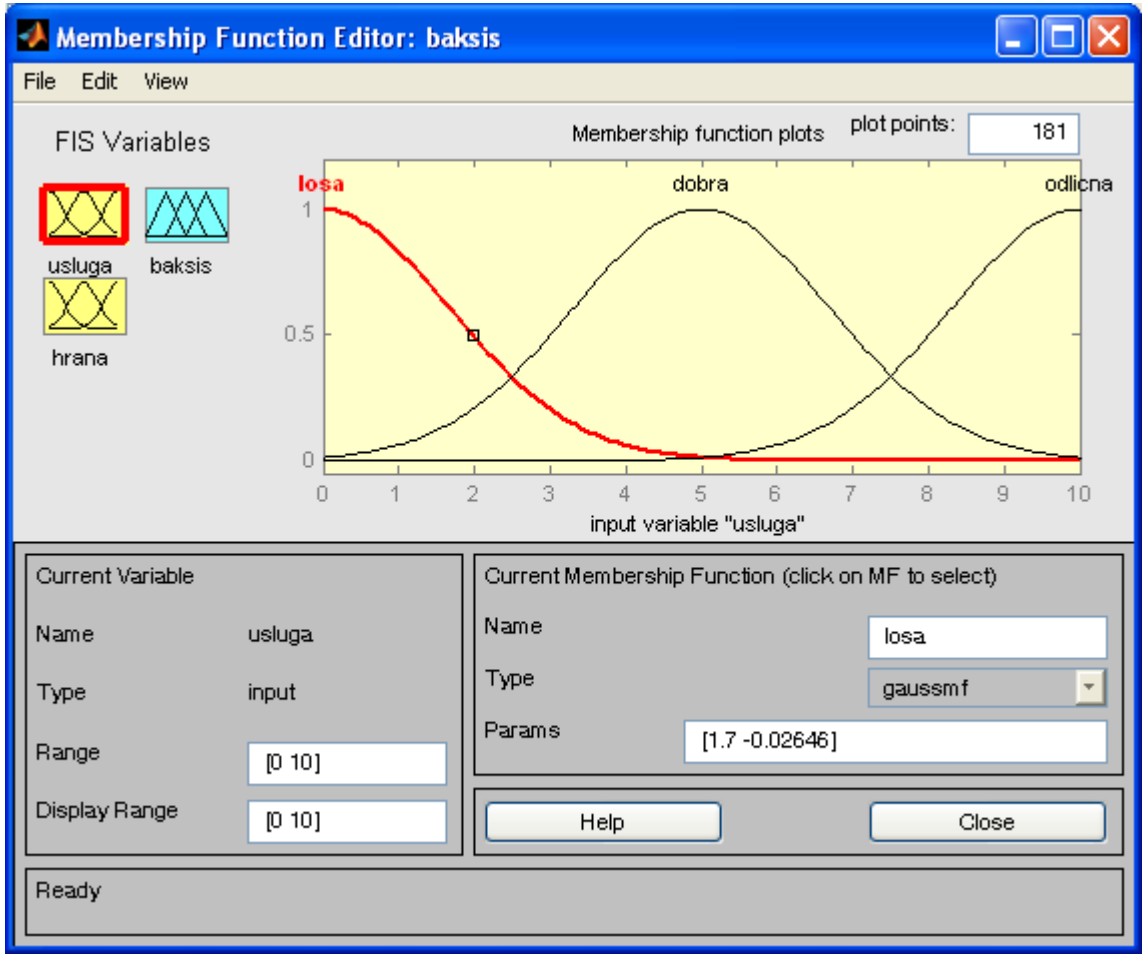
Definisanje ulaza i izlaza

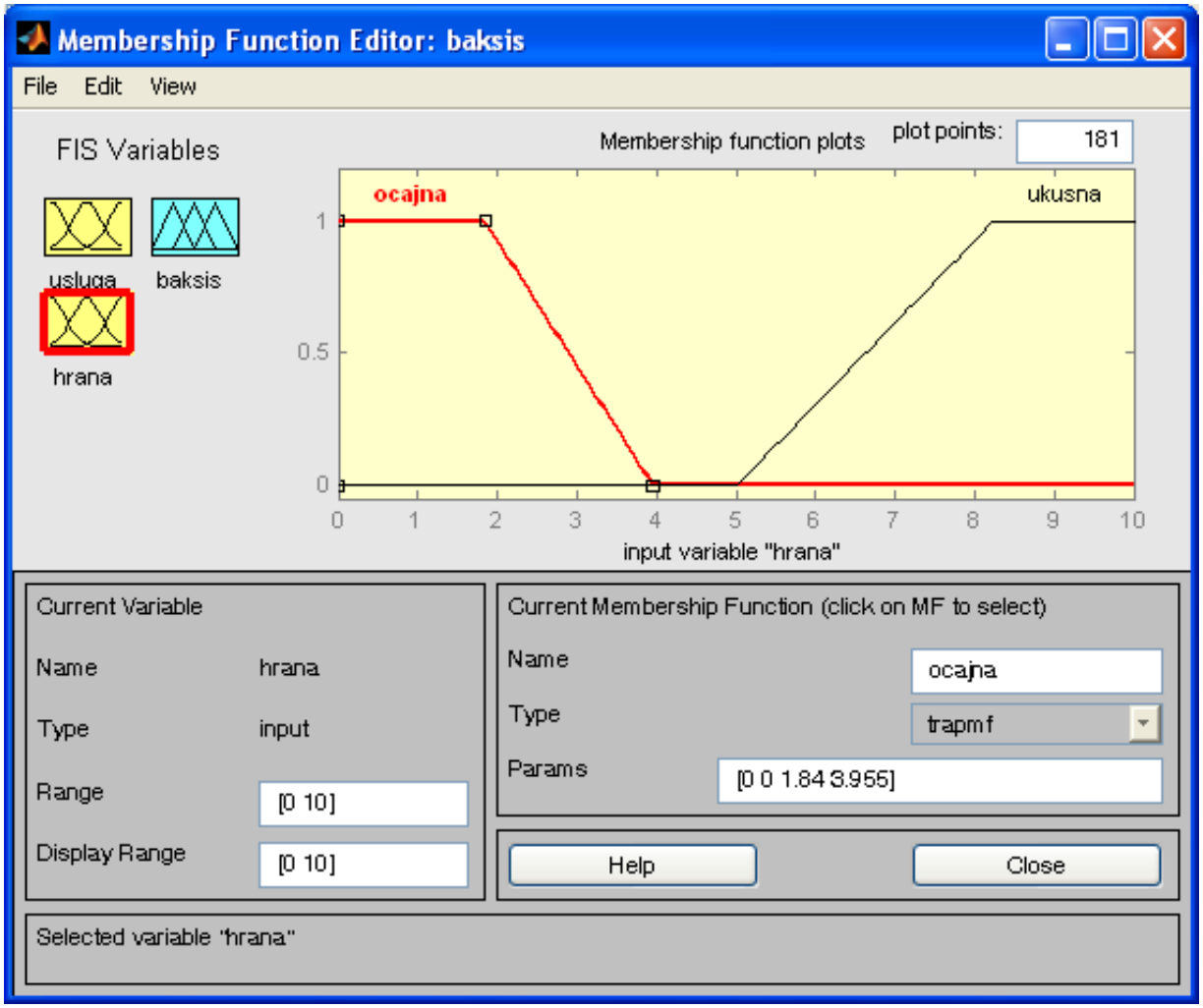
Promenljiva (tip)	Opseg vrednosti	Funkcije pripadnosti	Tip
usluga (ulaz)	0…10	loša	gaus
		dobra	gaus
		odlična	gaus
hrana (ulaz)	0…10	očajna	trapez
		ukusna	trapez
bakšiš (izlaz)	0…30	mali	trougao
		prosečan	trougao
		velik	trougao

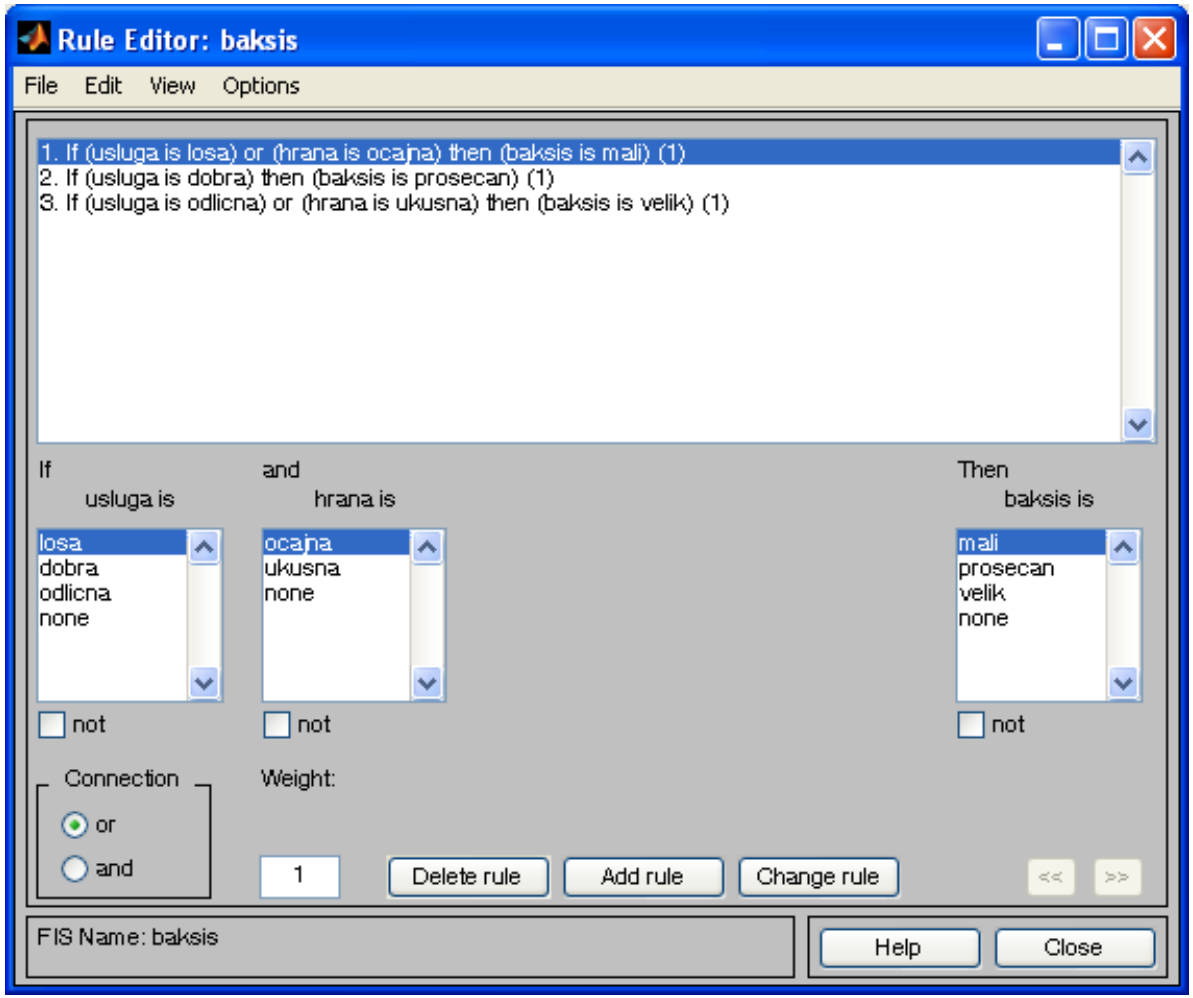
Pravila

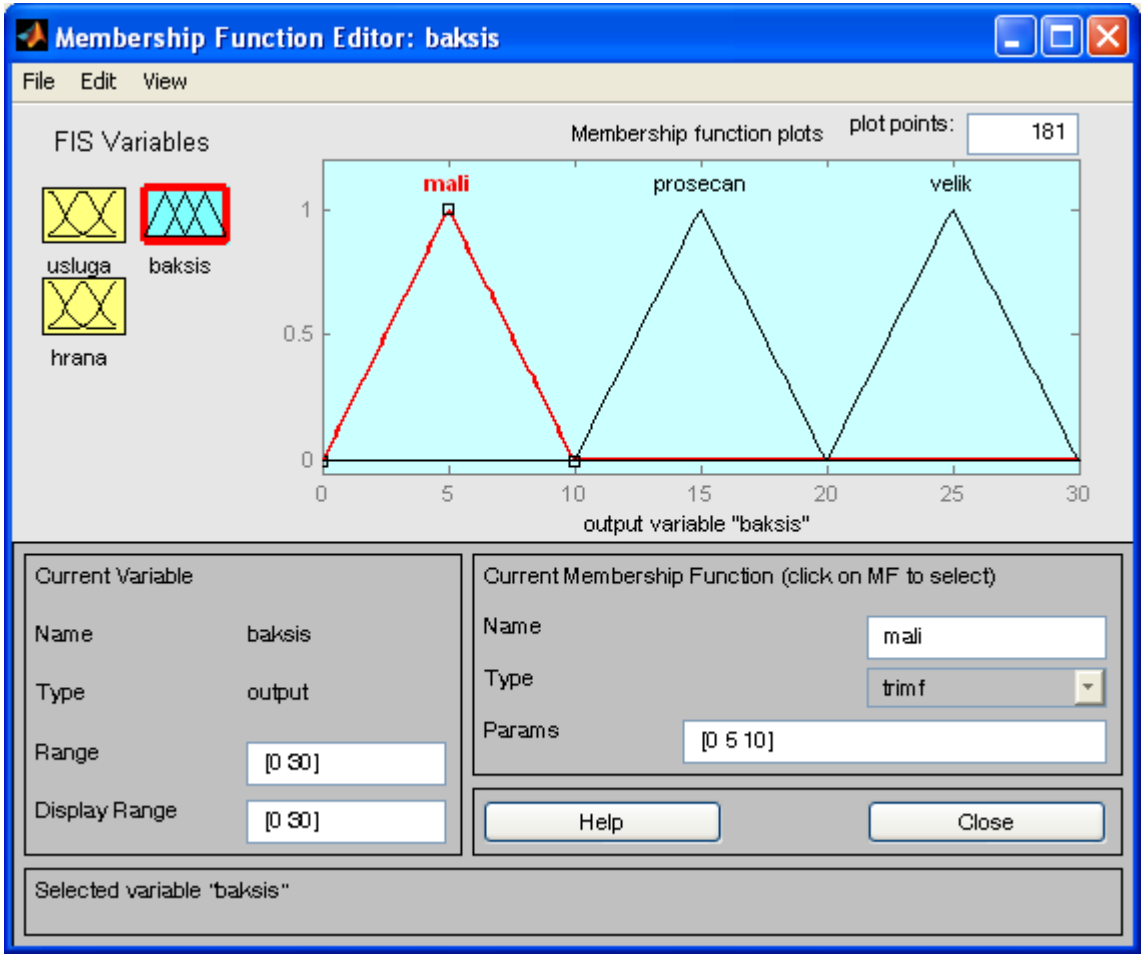
- 1. If (usluga is losa) or (hrana is losa) then (baksis is mali)
- 2. If (usluga is dobra) then (baksis is prosecan)
- 3. If (usluga is odlicna) or (hrana is dobra) then (baksis is velik)




Membership Function Editor: baksis
File
Edit
View
FIS Variables
usluga
baksis
hrana
Membership function plots
plot points:
181
losa
dobra
odlicna
1
0.5
0
0
1
2
3
4
5
6
7
8
9
10
input variable "usluga"
Current Variable
Name
usluga
Type
input
Range
[0 10]
Display Range
[0 10]
Current Membership Function (click on MF to select)
Name
losa
Type
gaussmf
Params
[1.7 -0.02646]
Help
Close
Ready


Membership Function Editor: baksis
File
Edit
View
FIS Variables
usluga
baksis
hrana
Membership function plots
plot points:
181
ocajna
ukusna
1
0.5
0
0
1
2
3
4
5
6
7
8
9
10
input variable "hrana"
Current Variable
Name
hrana
Type
input
Range
[0 10]
Display Range
[0 10]
Current Membership Function (click on MF to select)
Name
ocajna
Type
trapmf
Params
[0 0 1.84 3.955]
Help
Close
Selected variable "hrana"


Rule Editor: baksis
File Edit View Options
1. If (usluga is losa) or (hrana is ocajna) then (baksis is mali) (1)
2. If (usluga is dobra) then (baksis is prosecan) (1)
3. If (usluga is odlicna) or (hrana is ukusna) then (baksis is velik) (1)
If
usluga is
losa
dobra
odlicna
none
not
and
hrana is
ocajna
ukusna
none
not
Then
baksis is
mali
prosecan
velik
none
not
Connection
or
and
Weight:
1
Delete rule
Add rule
Change rule
<<
>>
FIS Name: baksis
Help
Close


Membership Function Editor: baksis
File
Edit
View
FIS Variables
usluga
baksis
hrana
Membership function plots
plot points:
181
mali
prosecan
velik
1
0.5
0
0
5
10
15
20
25
30
output variable "baksis"
Current Variable
Name
baksis
Type
output
Range
[0 30]
Display Range
[0 30]
Current Membership Function (click on MF to select)
Name
mali
Type
trimf
Params
[0 5 10]
Help
Close
Selected variable "baksis"

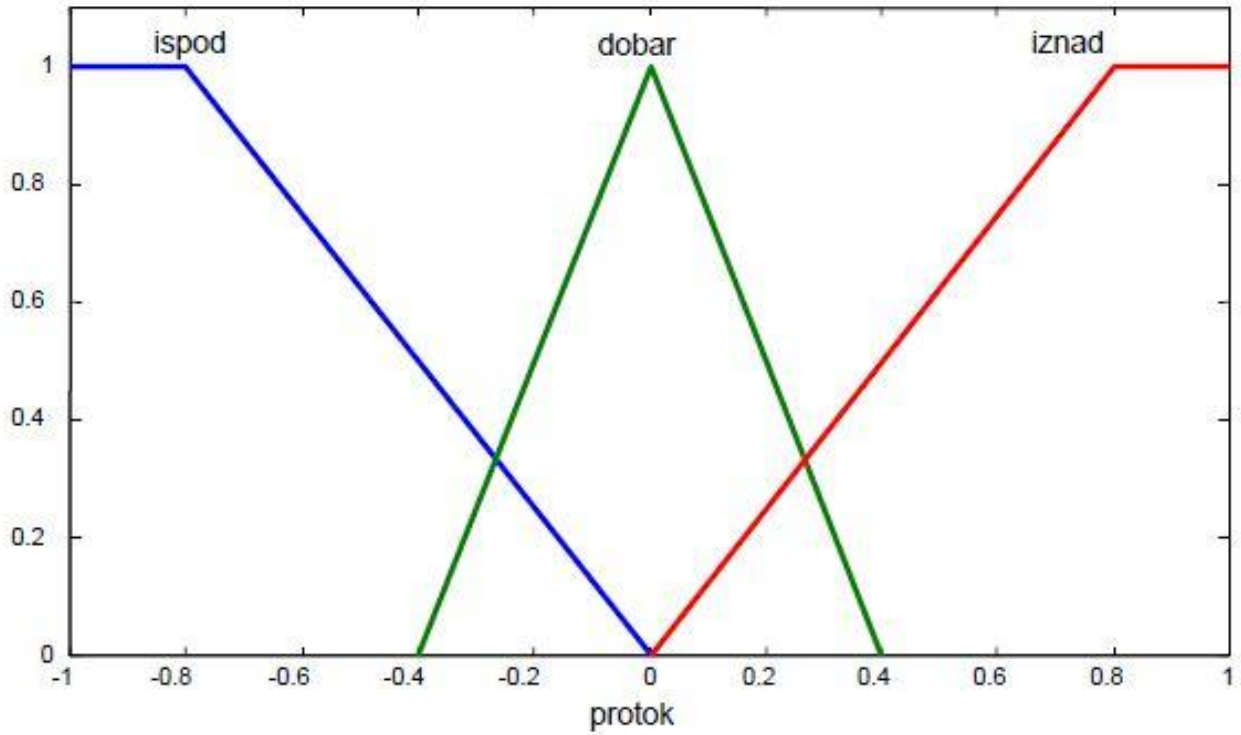
Primer: Bakšiš - Sugeno

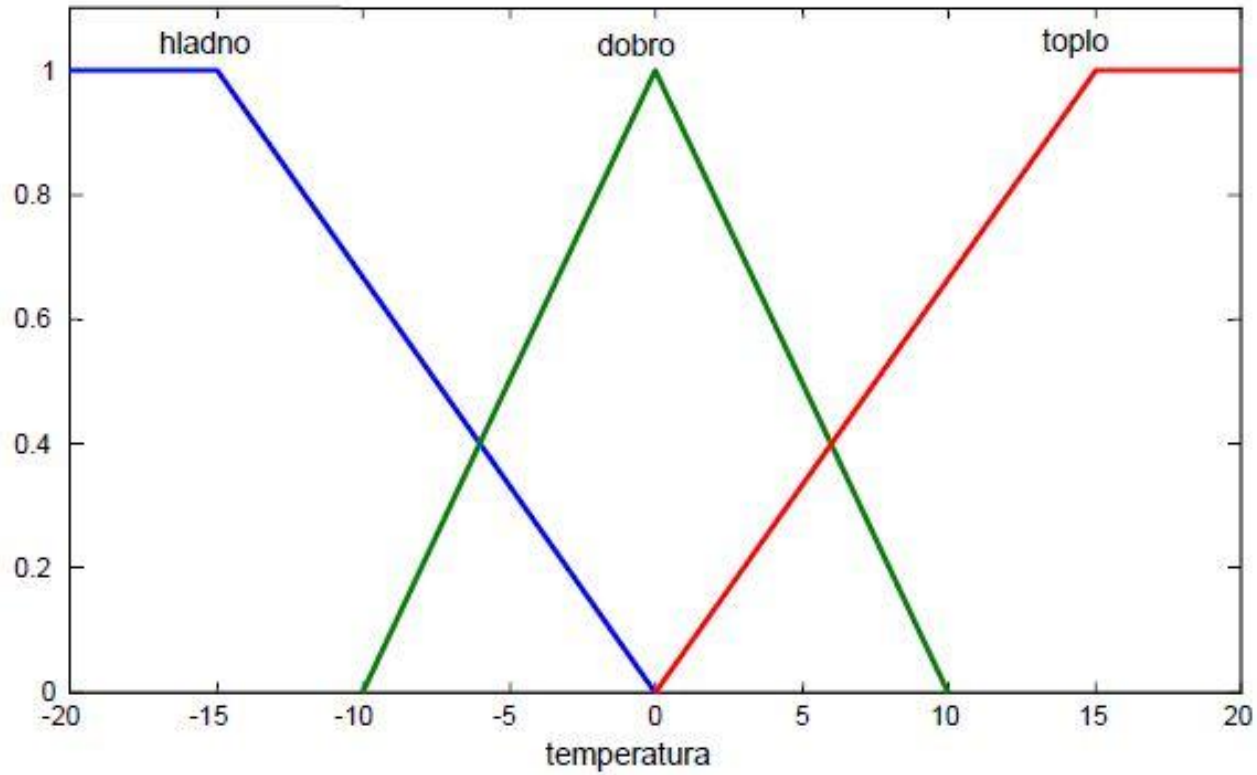
Za sugeno tip, ulazi i pravila su isti, dok su izlazi:

- za velik bakšiš 25
- za srednji 15
- za mali 5

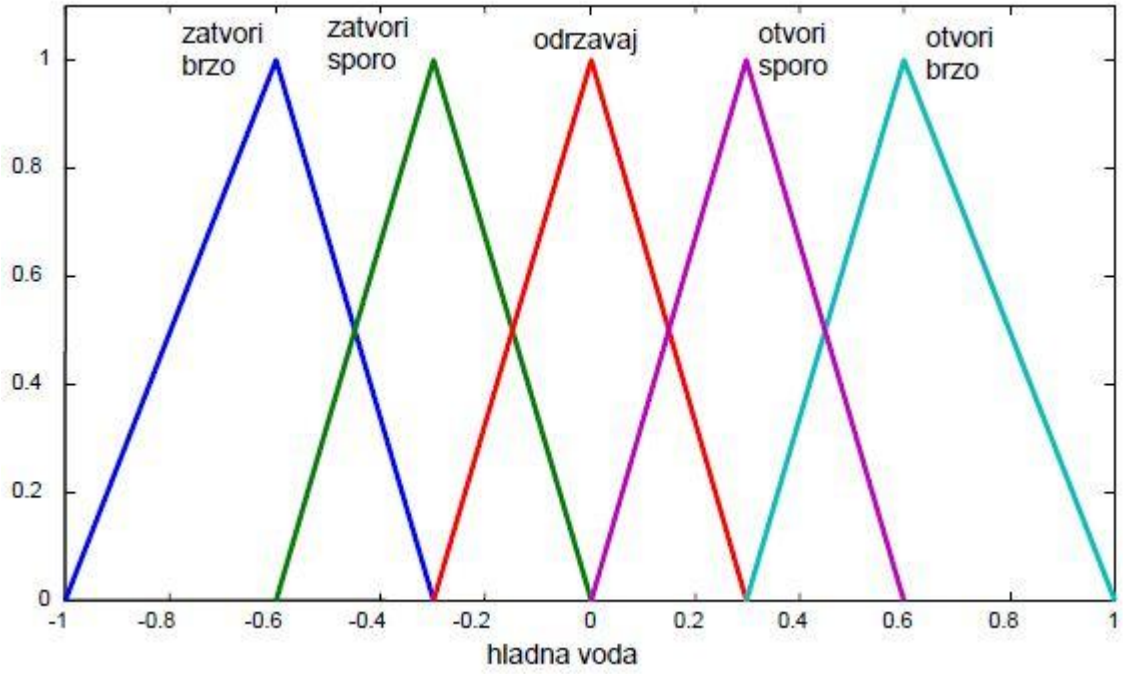
Regulacija temperature i protoka u sistemu

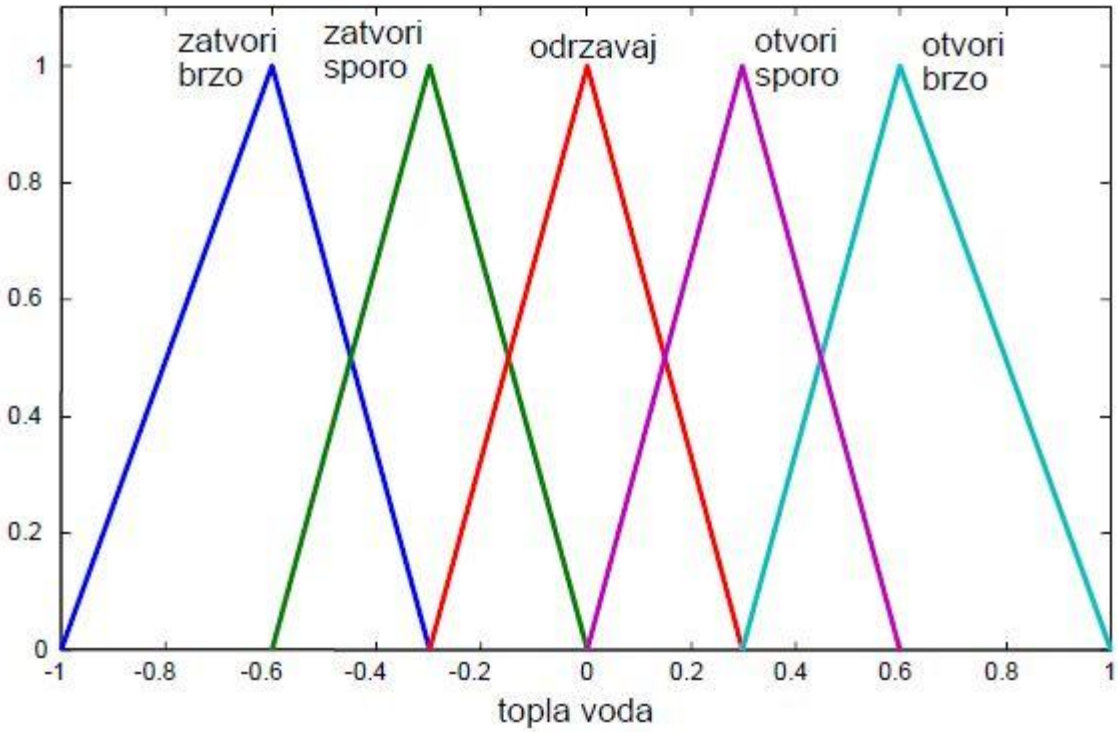
Definisanje funkcije pripadnosti za ulaze (protok i temperatura):




hladno
dobro
toplo
1
0.8
0.6
0.4
0.2
0
-20
-15
-10
-5
0
5
10
15
20
temperatura

Definisanje funkcije pripadnosti za izlaze (hladna i topla voda):



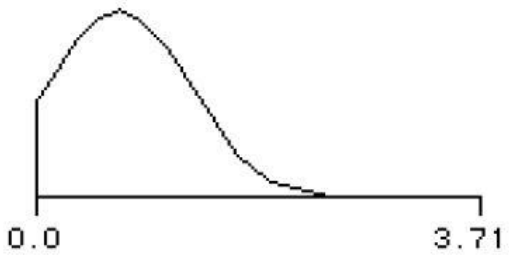
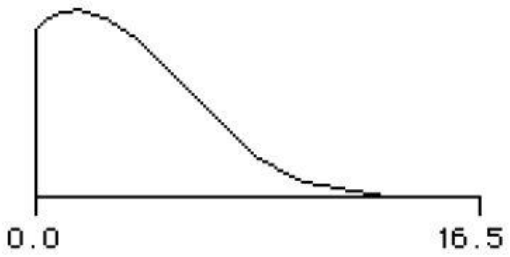
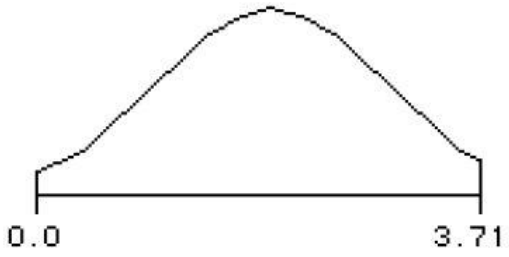

zatvori
brzo
zatvori
sporo
odrzavaj
otvori
sporo
otvori
brzo
1
0.8
0.6
0.4
0.2
0
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
topla voda

Pravila:

1. If(temperatura is hladno) and (protok is ispod) then (hladna is otvori sporo)(topla is otvori brzo)
2. If(temperatura is hladno) and (protok is dobar) then (hladna is zatvori sporo)(topla is otvori sporo)
3. If(temperatura is hladno) and (protok is iznad) then (hladna is zatvori brzo)(topla is zatvori sporo)
4. If(temperatura is dobro) and (protok is ispod) then (hladna is otvori sporo)(topla is otvori sporo)
5. If(temperatura is dobro) and (protok is dobar) then (hladna is odrzavaj)(topla is odrzavaj)
6. If(temperatura is dobro) and (protok is iznad) then (hladna is zatvori sporo)(topla is zatvori sporo)
7. If(temperatura is toplo) and (protok is ispod) then (hladna is otvori brzo)(topla is otvori sporo)
8. If(temperatura is toplo) and (protok is dobar) then (hladna is otvori sporo)(topla is zatvori sporo)
9. If(temperatura is toplo) and (protok is iznad) then (hladna is zatvori sporo)(topla is zatvori brzo)

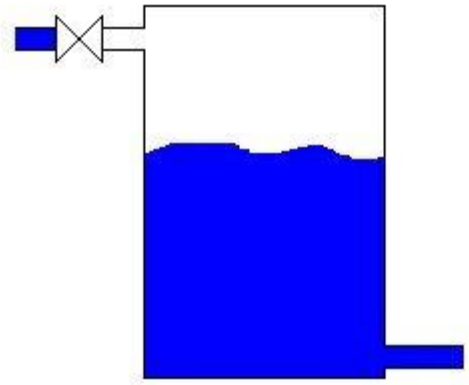
Predviđanje putovanja

Potrebno je predviditi broj putovanja u zavisnosti od posedovanja kola i zaposlenosti, ukoliko važe sledeća pravila:

	Ako je posedovanje kola	i	zaposlenost je	onda je	br putovanja
Pravilo 1					brPutovanja= 0.95 posedovanjeKola +0.50 zaposlenost +0.49
Pravilo 2					brPutovanja= 1.1 posedovanjeKola +1.8 zaposlenost -0.17

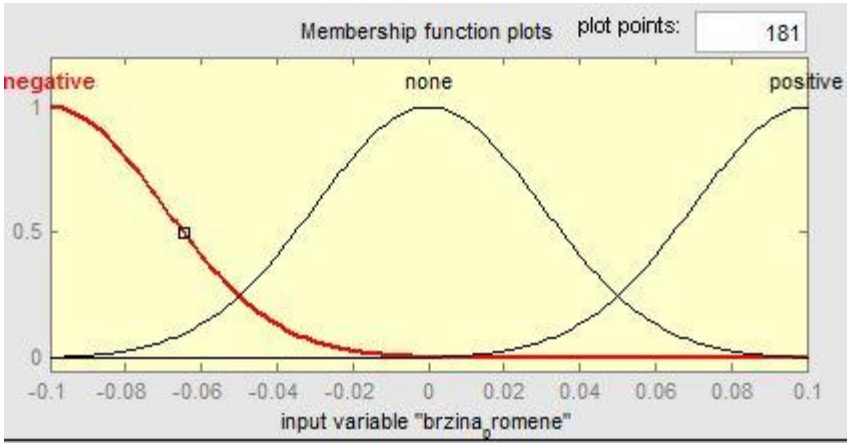
Odrediti fuzzy sistem kojim se najlakse opisuju ova pravila.

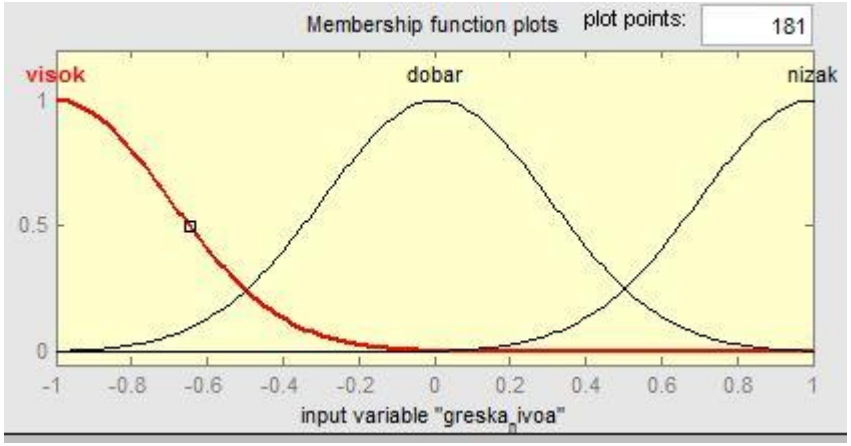
Kontrola nivoa vode u tanku



Ulazi u fuzzy kontroler su greška nivoa vode (razlika željene i trenutne količine vode) i brzine promene vode. Treba kontrolisati otvorenost ventila vode, kako bi se nivo vode uvek održavao na željenoj vrednosti. Potrebno je koristiti Sugeno tip.
Greška se kreće od -1 do 1, dok se brzina promene kreće od -0.1 do 0.1.

Rešenje

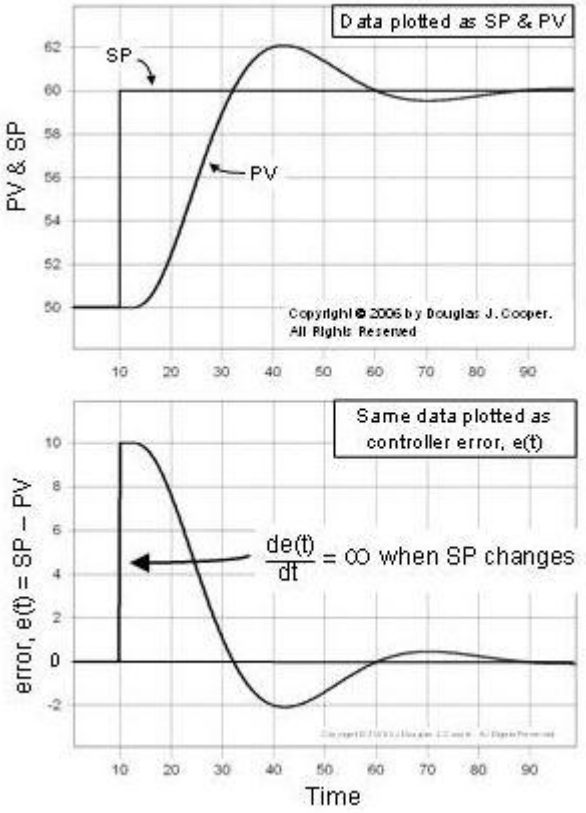




1. If (greska_nivoa is dobar) then (ventil is nema_promene) (1)
2. If (greska_nivoa is nizak) then (ventil is otvori_brzo) (1)
3. If (greska_nivoa is visok) then (ventil is zatvori_brzo) (1)
4. If (greska_nivoa is dobar) and (brzina_promene is positive) then (ventil is otvori_sporo) (1)
5. If (greska_nivoa is dobar) and (brzina_promene is negative) then (ventil is zatvori_sporo) (1)

Za ovaj sistem želimo da povećamo nivo vode kada je greška pozitivna (ž-d>0 tj. željeni nivo je veći od postojećeg), ali ne želimo da pustimo previše vode ako se greška brzo približava nuli, u suprotnom, nivo vode će preći granicu. Ulazi su se mogli predstaviti i drugom funkcijom pripadnosti. Potrebno je samo obratiti pažnju šta je dobro za sistem (kad je greška nula). Za prikazivanje otvaranja ventila, koristile su se sledeće vrednosti:

- Otvori brzo 0.9
- Otvori sporo 0.3
- Nema promene 0
- Zatvori sporo -0.5
- Zatvori brzo -0.9



ako je brzina promene pozitivna, a e=0, znaci da funkcija greske raste, ondnosno da ce set point biti veci od željene vrednosti u sledecem koraku, pa se zato ventil treba sporo otvoriti.