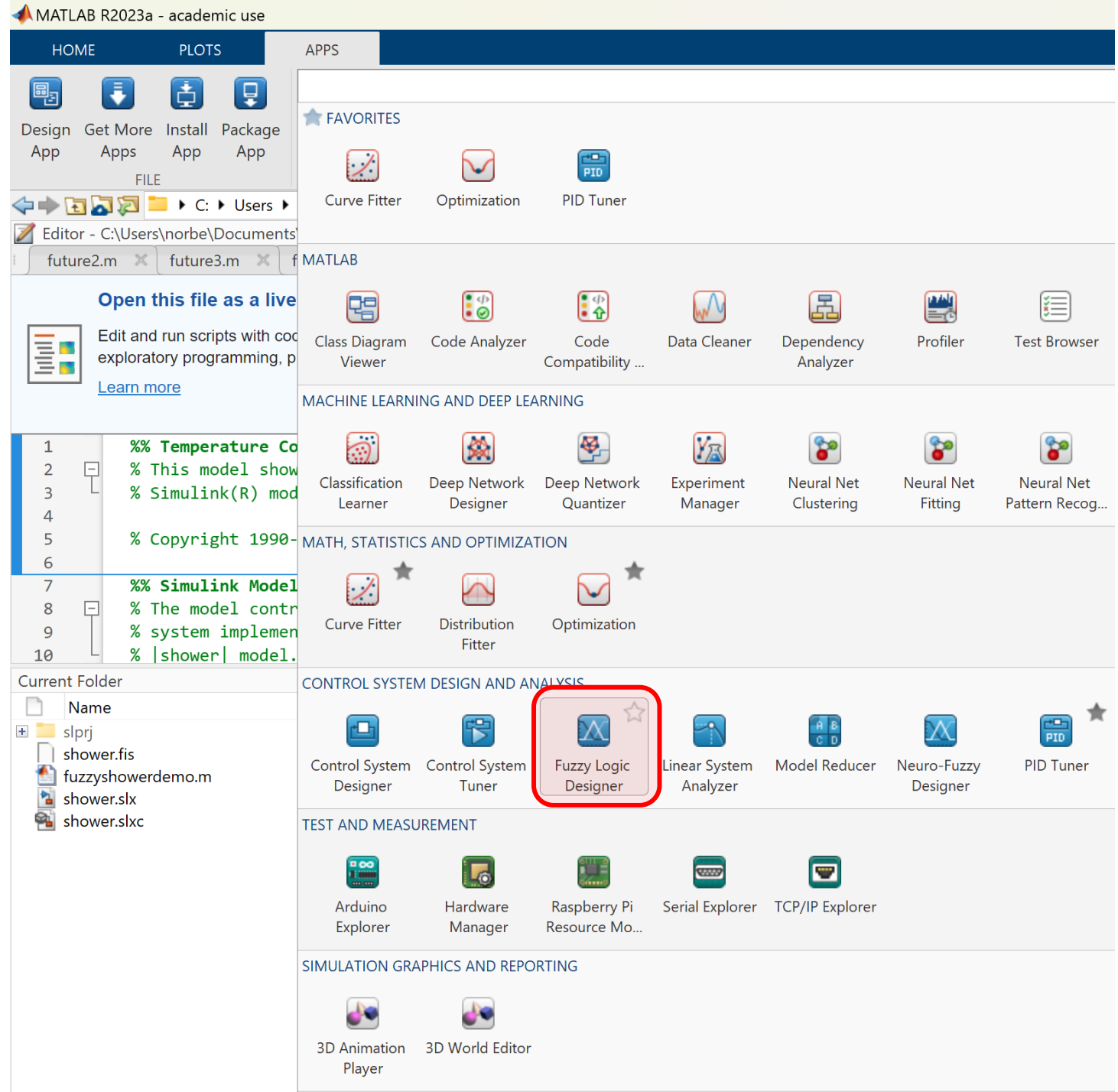



Krótkie
info
jak
korzystać
z
Fuzzy
Logic
Designer
w
Matlabie



MATLAB® Fuzzy Logic Designer

Open









Open from File  Browse ...

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Recent Files

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-  [browarki](#)

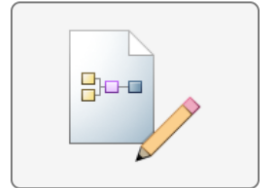
Learn

-  [Get Started](#)
-  [Mamdani and Sugeno Systems](#)
-  [Type-2 Fuzzy Inference Systems](#)
-  [Fuzzy Logic Designer](#)
-  [Build Fuzzy Systems Using App](#)
-  [Define Fuzzy Rules Using App](#)
-  [Define Membership Functions Using App](#)
-  [Tune Fuzzy Systems Using App](#)

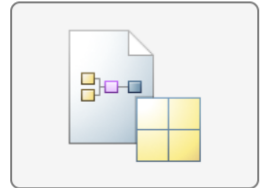
Create

☒ Generate rules automatically

▼ General Fuzzy Inference Systems (FIS)

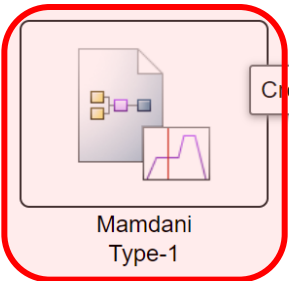


Custom
FIS



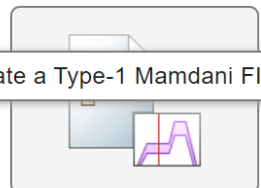
FIS from
Data

▼ Template Fuzzy Inference Systems (FIS)



Mamdani
Type-1

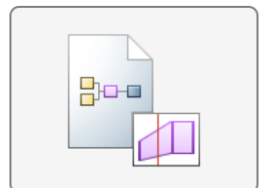
Create a Type-1 Mamdani FIS



Mamdani
Type-2



Sugeno
Type-1



Sugeno
Type-2

Jeśli chcemy dodać kolejne wejście (domyślnie dostajemy 2 wejścia i jedno wyjście) ...

Fuzzy Logic Designer: mamdanitype1

DESIGN TUNING

New Save Import Input Output Rule Add All Rules Mamdani to Sugeno Type-1 to Type-2 Number of Samples 101 Input Data: Select Output Data: Select Rule Inference Control Surface System Validation Store Current Design Export

FILE ADD COMPONENTS CONVERT FIS SIMULATION DESIGNS EXPORT

DESIGN BROWSER

Active	Design	Type	Compare
✓	mamdanitype1	Mamdani Type-1	✓

SYSTEM BROWSER

- mamdanitype1
 - Inputs
 - Outputs
 - Rules

Fuzzy Inference System (FIS) Plot Membership Function (MF) Editor Rule Editor

System: mamdanitype1

input1 (3 MFs)

input2 (3 MFs)

Mamdani Type 1

output1 (3 MFs)

System mamdanitype1: 2 input, 1 output, 9 rules

PROPERTY EDITOR: FIS

Type: Mamdani Type-1

Name: mamdanitype1

And method: min

Or method: max

Implication method: min

Aggregation method: max

Defuzzification method: centroid

Inputs: 2

Outputs: 1

Rules: 9

jeśli chcemy dodać kolejną zmienną lingwistyczną opisaną funkcją przynależności do któregoś z wejść, bądź wyjść

edycja funkcji przynależności opisujących zmiennę lingwistyczne

Fuzzy Logic Designer: mamdanitype1

DESIGN TUNING

New Save Import

MF

Mamdani to Sugeno Type-1 to Type-2

Number of Samples: 101

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

Store Current Design

Export

DESIGNS EXPORT

DESIGN BROWSER

Set Active Design

Active Design Type Compare

✓ mamdanitype1 Mamdani Type-1 ✓

SYSTEM BROWSER

mamdanitype1

- Inputs
 - input1
 - mf1
 - mf2
 - mf3
 - input2
- Outputs
 - output1
- Rules

Membership Function Plot

System: mamdanitype1

Degree of Membership

Input Variable "input1"

mf1 mf2 mf3

PROPERTY EDITOR: INPUT

Name: input1

Range: [0 1]

Number of MFs: 3

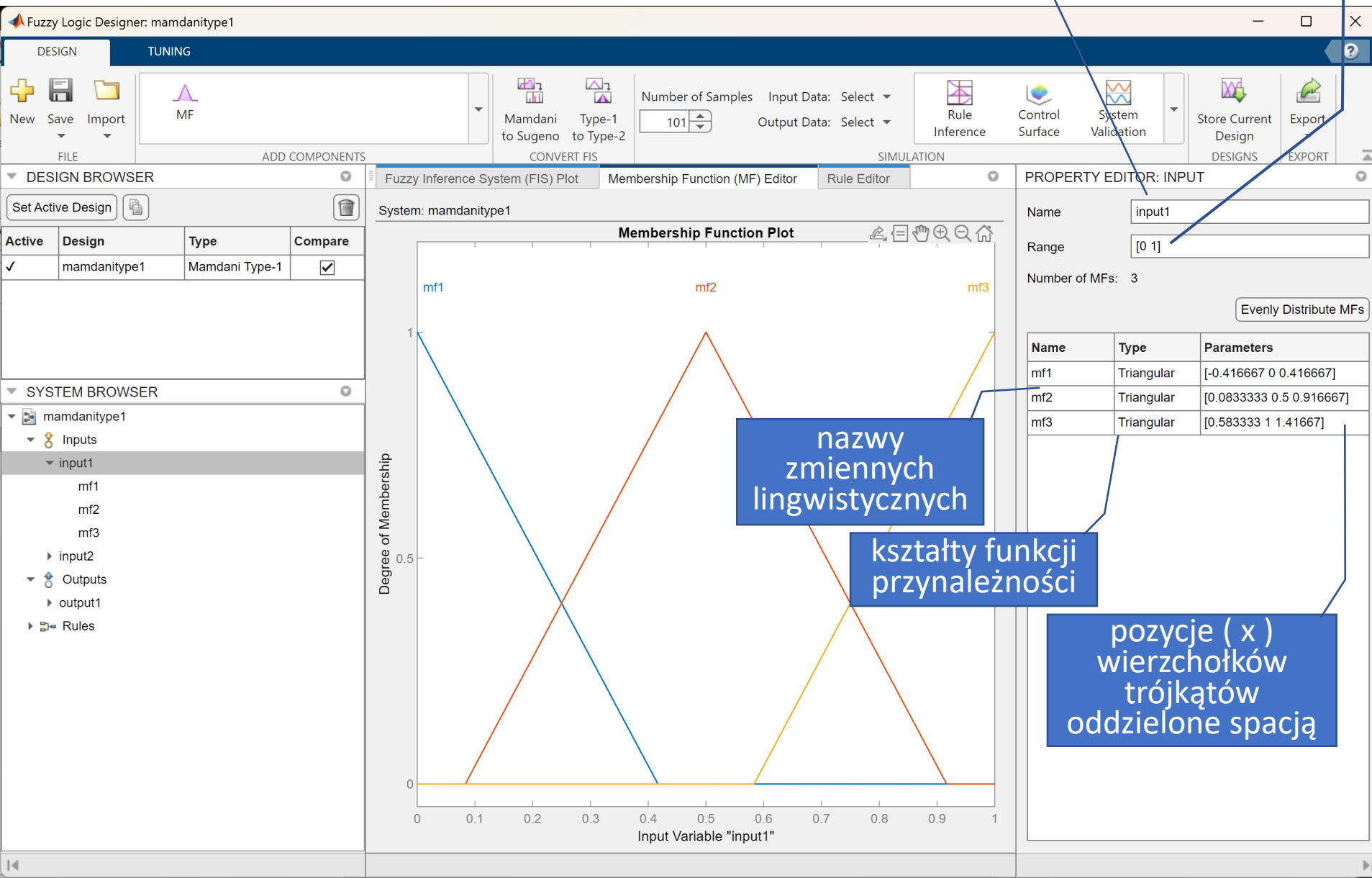
Evenly Distribute MFs

Name	Type	Parameters
mf1	Triangular	[-0.416667 0 0.416667]
mf2	Triangular	[0.0833333 0.5 0.916667]
mf3	Triangular	[0.583333 1 1.41667]

które zmienne modyfikujemy

fizyczne dziedziny wejść –
„nośnik zbiorów rozmytych”

nazwy wejść
(i wyjść)



Fuzzy Logic Designer: mamdanitype1

DESIGN

TUNING

New

Save

Import

FILE

Input

Output

MF

Rule

ADD COMPONENTS

Mamdani to Sugeno

Type-1 to Type-2

CONVERT FIS

Number of Samples

101

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

SIMULATION

Store Current Design

Export

DESIGNSEXPORT

DESIGN BROWSER

Set Active Design

Active	Design	Type	Compare
✓	mamdanitype1	Mamdani Type-1	✓

SYSTEM BROWSER

mamdanitype1

Inputs

input1

mf1

mf2

mf3

input2

Outputs

output1

Rules

rule1

rule2

rule3

rule4

rule5

rule6

rule7

rule8

rule9

Fuzzy Inference System (FIS) Plot

Membership Function (MF) Editor

Rule Editor

System: mamdanitype1

Add All Possible Rules

Clear All Rules

edycja bazy reguł

	Rule	Weight	Name
1	If input1 is mf1 and input2 is mf1 then output1 is mf1	1	rule1
2	If input1 is mf2 and input2 is mf1 then output1 is mf1	1	rule2
3	If input1 is mf3 and input2 is mf1 then output1 is mf1	1	rule3
4	If input1 is mf1 and input2 is mf2 then output1 is mf1	1	rule4
5	If input1 is mf2 and input2 is mf2 then output1 is mf1	1	rule5
6	If input1 is mf3 and input2 is mf2 then output1 is mf1	1	rule6
7	If input1 is mf1 and input2 is mf3 then output1 is mf1	1	rule7
8	If input1 is mf2 and input2 is mf3 then output1 is mf1	1	rule8
9	If input1 is mf3 and input2 is mf3 then output1 is mf1	1	rule9

PROPERTY EDITOR: RULE

Name: rule1

Weight: 1

Connection: ☒ And ☐ Or

If

input1

is

mf1

and

input2

is

mf1

Then

output1

is

mf1

pierwsza część reguły rozmytej

wynik reguły rozmytej

DESIGN TUNING

New Save Import Rule Add All Rules Mamdani to Sugeno Type-1 to Type-2 Number of Samples 101 Input Data: Select Output Data: Select Rule Inference Control Surface System Validation Store Current Design Export

DESIGN BROWSER

Set Active Design

Active	Design	Type	Compare
✓	browarki	Mamdani Type-1	✓

SYSTEM BROWSER

- browarki
 - Inputs
 - Temperatura
 - Niska
 - Srednia
 - Goraca
 - Optymalna
 - budzet
 - maly
 - sredni
 - Duzy
 - Outputs
 - ile_browarkow
 - BMalo
 - Srednio
 - BDuzy
 - Malo
 - Duzy
 - Rules
 - rule1
 - rule2
 - rule3
 - rule4
 - rule5
 - rule6
 - rule7
 - rule8
 - rule9

Fuzzy Inference System (FIS) Plot Membership Function (MF) Editor Rule Editor

System: browarki

Tak to wygląda dla przykładu z wykładu – (ten o majowym długim weekendzie)

Temperatura (4 MFs)

budzet (3 MFs)

Mamdani Type 1

ile_browarkow (5 MFs)

PROPERTY EDITOR: RULES

Number of rules: 12 View in Rule Editor

	Rule
1	If (Temperatura is Niska) and (budzet is maly) then (il.
2	If (Temperatura is Niska) and (budzet is sredni) then .
3	If (Temperatura is Niska) and (budzet is Duzy) then (i.
4	If (Temperatura is Srednia) and (budzet is maly) then.
5	If (Temperatura is Srednia) and (budzet is sredni) the.
6	If (Temperatura is Srednia) and (budzet is Duzy) the..
7	If (Temperatura is Goraca) and (budzet is maly) then .
8	If (Temperatura is Goraca) and (budzet is sredni) the..
9	If (Temperatura is Goraca) and (budzet is Duzy) then.
10	If (Temperatura is Optymalna) and (budzet is maly) t..
11	If (Temperatura is Optymalna) and (budzet is sredni) .
12	If (Temperatura is Optymalna) and (budzet is Duzy) t..

Preview

Name:

Weight:

Description:

System browarki: 2 input, 1 output, 12 rules

DESIGN

TUNING

+

Save

Import

MF

Mamdani to Sugeno

Type-1 to Type-2

Number of Samples

101

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

Store Current Design

Export

FILE

ADD COMPONENTS

CONVERT FIS

SIMULATION

DESIGNS

EXPORT

DESIGN BROWSER

Set Active Design

Active	Design	Type	Compare
✓	browarki	Mamdani Type-1	✓

SYSTEM BROWSER

browarki

Inputs

Temperatura

Niska

Srednia

Goraca

Optymalna

budzet

maly

sredni

Duzy

Outputs

ile_browarkow

BMalo

Srednio

BDuzo

Malo

Duzo

Rules

rule1

rule2

rule3

rule4

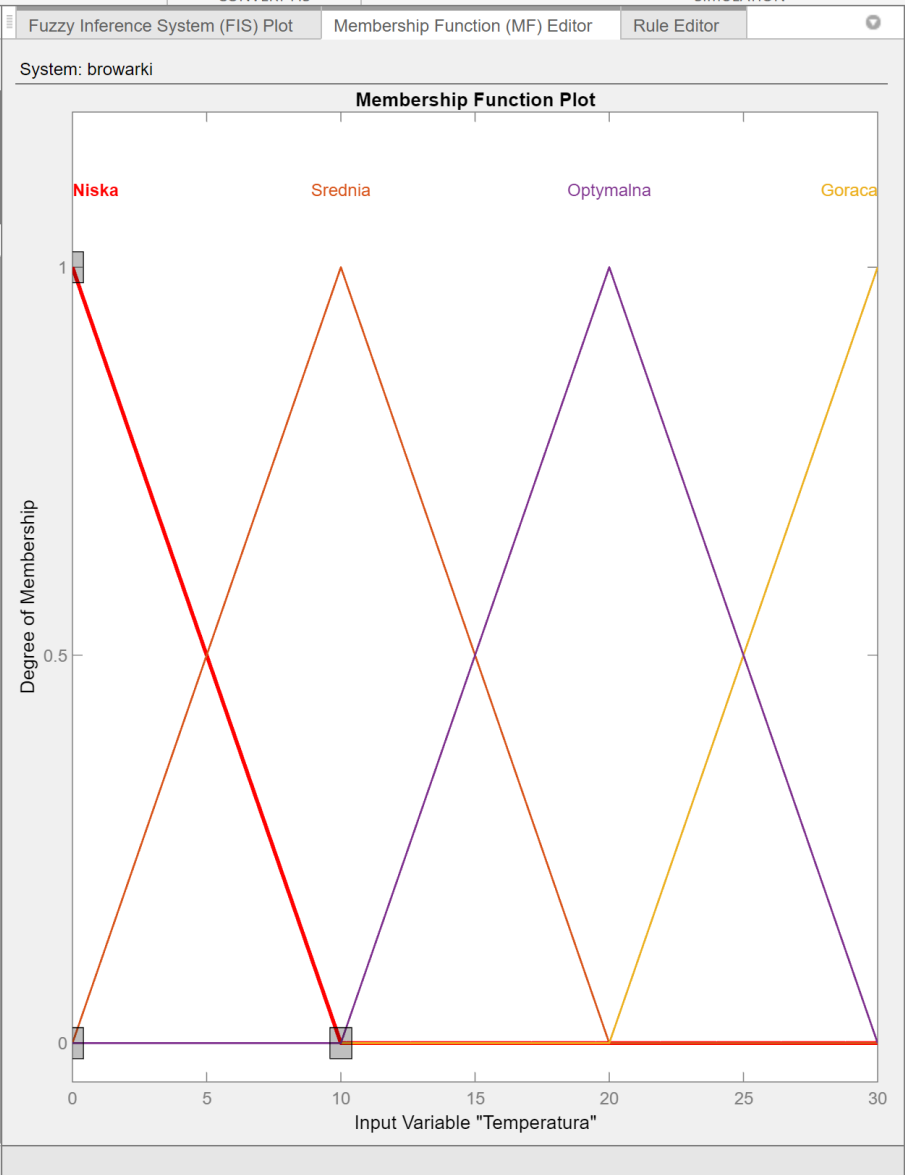
rule5

rule6

rule7

rule8

rule9



PROPERTY EDITOR: INPUT

Name

Temperatura

Range

[0 30]

Number of MFs: 4

Evenly Distribute MFs

Name	Type	Parameters
Niska	Triangular	[0 0 10]
Srednia	Triangular	[0 10 20]
Goraca	Triangular	[20 30 30]
Optymalna	Triangular	[10 20 30]

DESIGN

TUNING

+

Save

Import

MF

Mamdani to Sugeno

Type-1 to Type-2

Number of Samples

101

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

Store Current Design

Export

FILE

ADD COMPONENTS

CONVERT FIS

SIMULATION

DESIGNS

EXPORT

DESIGN BROWSER

Set Active Design

Active	Design	Type	Compare
✓	browarki	Mamdani Type-1	✓

SYSTEM BROWSER

browarki

Inputs

Temperatura

Niska

Srednia

Goraca

Optymalna

budzet

maly

sredni

Duzy

Outputs

ile_browarkow

BMalo

Srednio

BDuzo

Malo

Duzo

Rules

rule1

rule2

rule3

rule4

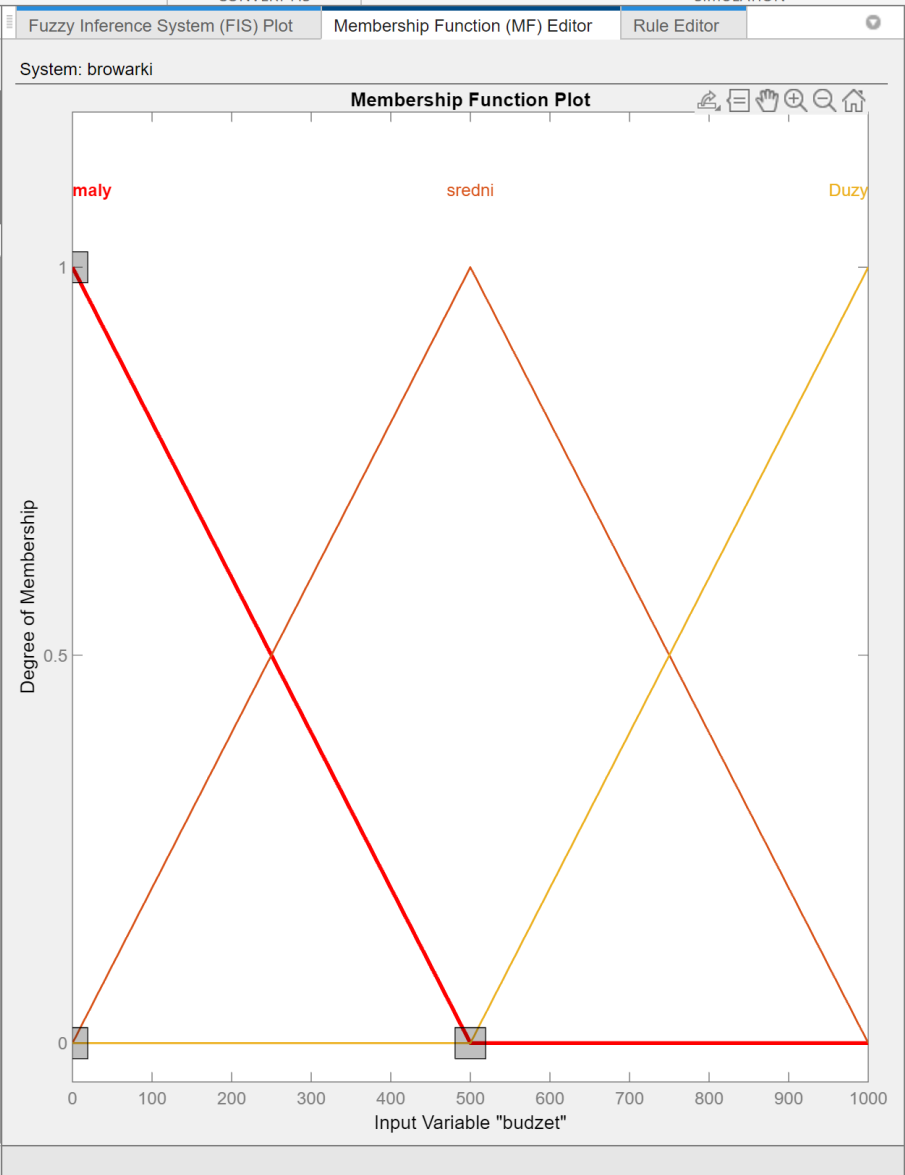
rule5

rule6

rule7

rule8

rule9



PROPERTY EDITOR: INPUT

Name

budzet

Range

[0 1000]

Number of MFs: 3

Evenly Distribute MFs

Name	Type	Parameters
maly	Triangular	[0 0 500]
sredni	Triangular	[0 500 1000]
Duzy	Triangular	[500 1000 1000]

DESIGN

TUNING

New

Save

Import

MF

Mamdani to Sugeno

Type-1 to Type-2

Number of Samples

101

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

Store Current Design

Export

FILE

ADD COMPONENTS

CONVERT FIS

SIMULATION

DESIGNS

EXPORT

DESIGN BROWSER

Set Active Design

Active	Design	Type	Compare
✓	browarki	Mamdani Type-1	✓

SYSTEM BROWSER

browarki

Inputs

Temperatura

Niska

Srednia

Goraca

Optymalna

budzet

maly

sredni

Duzy

Outputs

ile_browarkow

BMalo

Srednio

BDuzy

Malo

Duzy

Rules

rule1

rule2

rule3

rule4

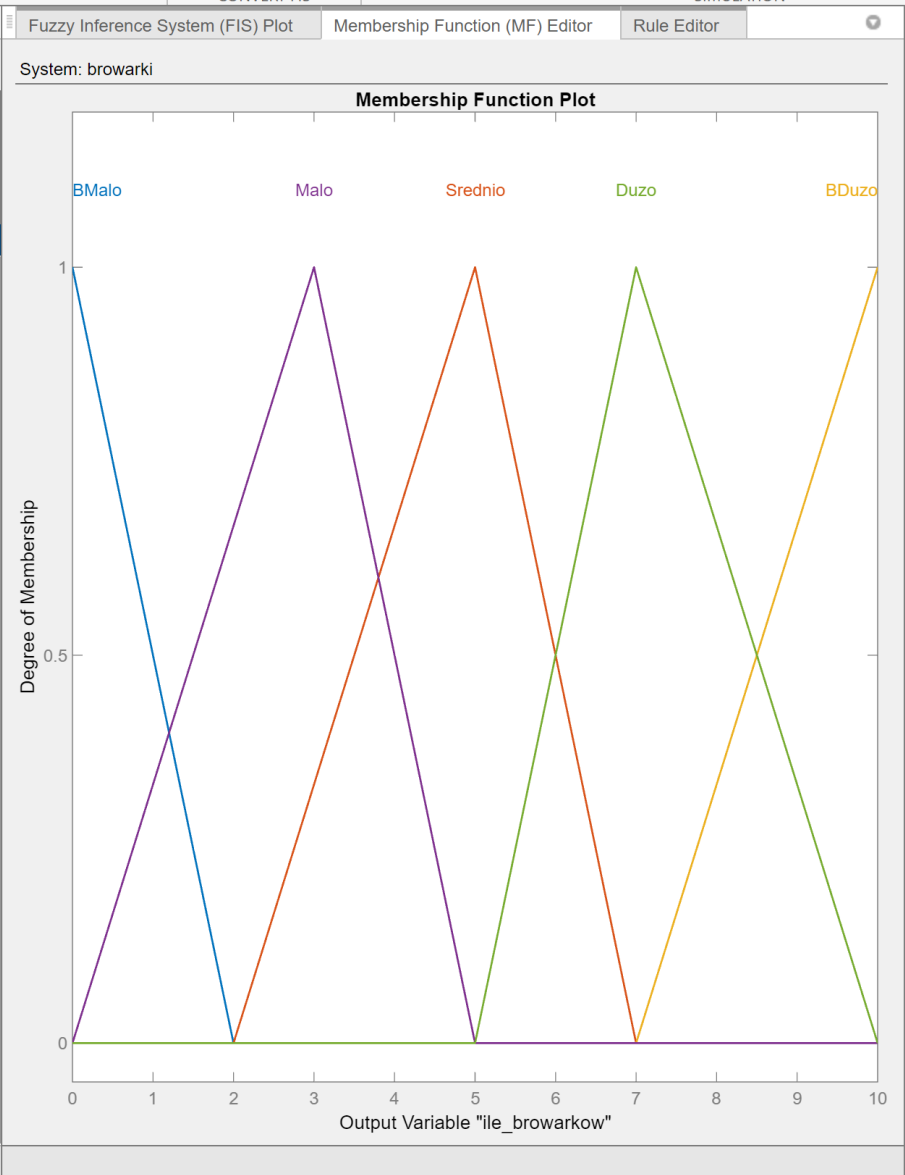
rule5

rule6

rule7

rule8

rule9



PROPERTY EDITOR: OUTPUT

Name

ile_browarkow

Range

[0 10]

Number of MFs: 5

Evenly Distribute MFs

Name	Type	Parameters
BMalo	Triangular	[0 0 2]
Srednio	Triangular	[2 5 7]
BDuzy	Triangular	[7 10 10]
Malo	Triangular	[0 3 5]
Duzy	Triangular	[5 7 10]

+

Save

Import

FILE

MF

ADD COMPONENTS

Mamdani to Sugeno

Type-1 to Type-2

CONVERT FIS

Number of Samples

101

↑

↓

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

Store Current Design

DESIGNS

Export

EXPORT

DESIGN

TUNING

+

Save

Import

FILE

MF

ADD COMPONENTS

Mamdani to Sugeno

Type-1 to Type-2

CONVERT FIS

Number of Samples

101

↑

↓

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

Store Current Design

DESIGNS

Export

EXPORT

▼ DESIGN BROWSER

Set Active Design

🗑️

Active	Design	Type	Compare
✓	browarki	Mamdani Type-1	✓

▼ SYSTEM BROWSER

📁 browarki

🔑 Inputs

▼ Temperatura

Niska

Srednia

Goraca

Optymalna

▼ budzet

maly

sredni

Duzy

🔑 Outputs

▼ ile_browarkow

BMalo

Srednio

BDuzo

Malo

Duzo

📜 Rules

rule1

rule2

rule3

rule4

rule5

rule6

rule7

rule8

rule9

Fuzzy Inference System (FIS) Plot

Membership Function (MF) Editor

Rule Editor

System: browarki

Add All Possible Rules

Clear All Rules

	Rule	W..	Name
1	If Temperatura is Niska and budzet is maly then ile_browarkow is BMalo	1	rule1
2	If Temperatura is Niska and budzet is sredni then ile_browarkow is Malo	1	rule2
3	If Temperatura is Niska and budzet is Duzy then ile_browarkow is Srednio	1	rule3
4	If Temperatura is Srednia and budzet is maly then ile_browarkow is BMalo	1	rule4
5	If Temperatura is Srednia and budzet is sredni then ile_browarkow is Malo	1	rule5
6	If Temperatura is Srednia and budzet is Duzy then ile_browarkow is Duzo	1	rule6
7	If Temperatura is Goraca and budzet is maly then ile_browarkow is Srednio	1	rule7
8	If Temperatura is Goraca and budzet is sredni then ile_browarkow is Duzo	1	rule8
9	If Temperatura is Goraca and budzet is Duzy then ile_browarkow is BDuzo	1	rule9
10	If Temperatura is Optymalna and budzet is maly then ile_browarkow is Malo	1	rule10
11	If Temperatura is Optymalna and budzet is sredni then ile_browarkow is Srednio	1	rule11
12	If Temperatura is Optymalna and budzet is Duzy then ile_browarkow is BDuzo	1	rule12

+

📄

🗑️

PROPERTY EDITOR: OUTPUT

Name

ile_browarkow

Range

[0 10]

Number of MFs: 5

Evenly Distribute MFs

Name	Type	Parameters
BMalo	Triangular	[0 0 2]
Srednio	Triangular	[2 5 7]
BDuzo	Triangular	[7 10 10]
Malo	Triangular	[0 3 5]
Duzo	Triangular	[5 7 10]

DESIGN

TUNING

New

Save

Import

MF

Mamdani to Sugeno

Type-1 to Type-2

Number of Samples

101

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

Store Current Design

Export

FILE

ADD COMPONENTS

CONVERT FIS

SIMULATION

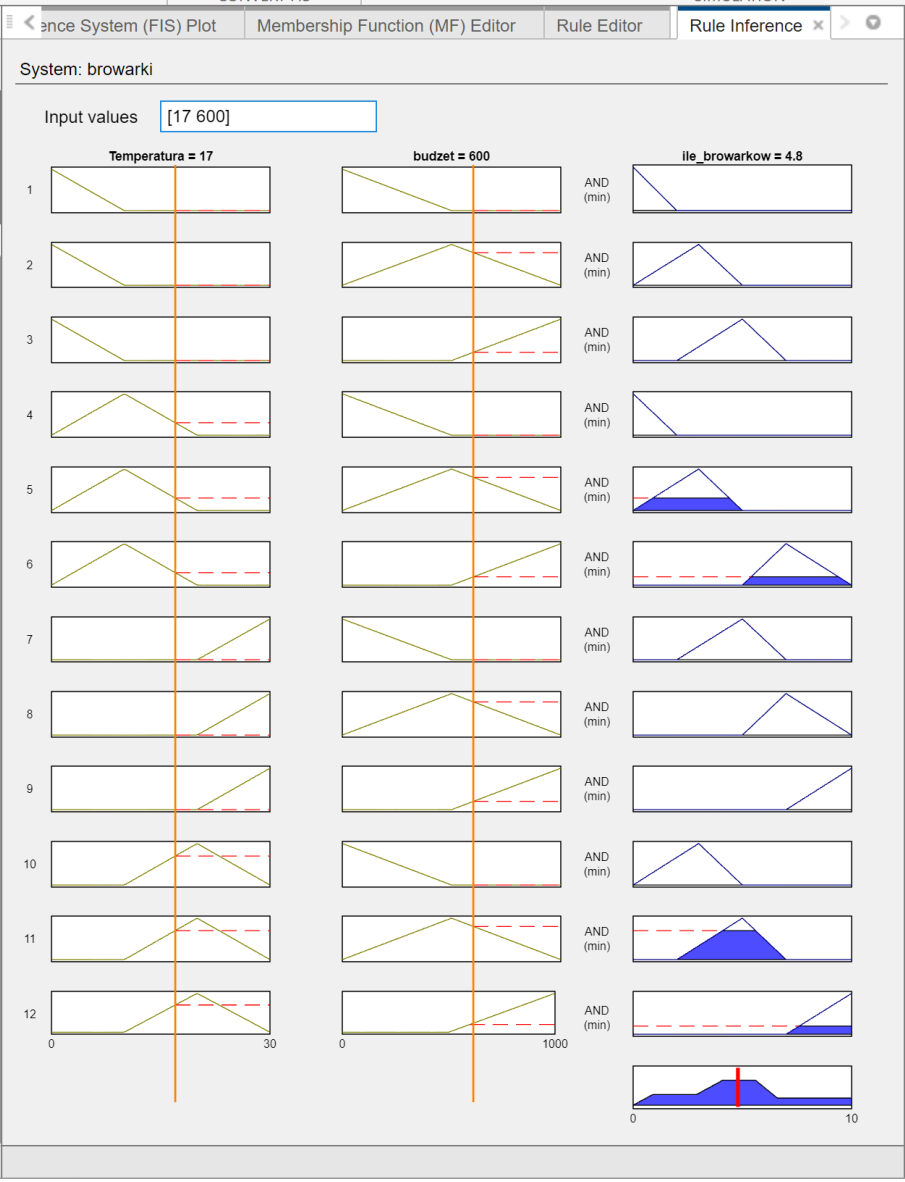
DESIGN BROWSER

Set Active Design

Active	Design	Type	Compare
✓	browarki	Mamdani Type-1	✓

SYSTEM BROWSER

<ul style="list-style-type: none"> browarki <ul style="list-style-type: none"> Inputs <ul style="list-style-type: none"> Temperatura <ul style="list-style-type: none"> Niska Srednia Goraca Optymalna budzet <ul style="list-style-type: none"> maly sredni Duzy Outputs <ul style="list-style-type: none"> ile_browarkow <ul style="list-style-type: none"> BMalo Srednio BDuzo Malo Duzo Rules <ul style="list-style-type: none"> rule1 rule2 rule3 rule4 rule5 rule6 rule7 rule8 rule9
--



PROPERTY EDITOR: OUTPUT

Name: ile_browarkow

Range: [0 10]

Number of MFs: 5

Evenly Distribute MFs

Name	Type	Parameters
BMalo	Triangular	[0 0 2]
Srednio	Triangular	[2 5 7]
BDuzo	Triangular	[7 10 10]
Malo	Triangular	[0 3 5]
Duzo	Triangular	[5 7 10]

DESIGN

TUNING

New

Save

Import

MF

Mamdani to Sugeno

Type-1 to Type-2

Number of Samples

101

Input Data: Select

Output Data: Select

Rule Inference

Control Surface

System Validation

Store Current Design

Export

FILE

ADD COMPONENTS

CONVERT FIS

SIMULATION

DESIGNS

EXPORT

DESIGN BROWSER

Set Active Design

Active	Design	Type	Compare
✓	browarki	Mamdani Type-1	✓

SYSTEM BROWSER

browarki

Inputs

Temperatura

Niska

Srednia

Goraca

Optymalna

budzet

maly

sredni

Duzy

Outputs

ile_browarkow

BMalo

Srednio

BDuzo

Malo

Duzo

Rules

rule1

rule2

rule3

rule4

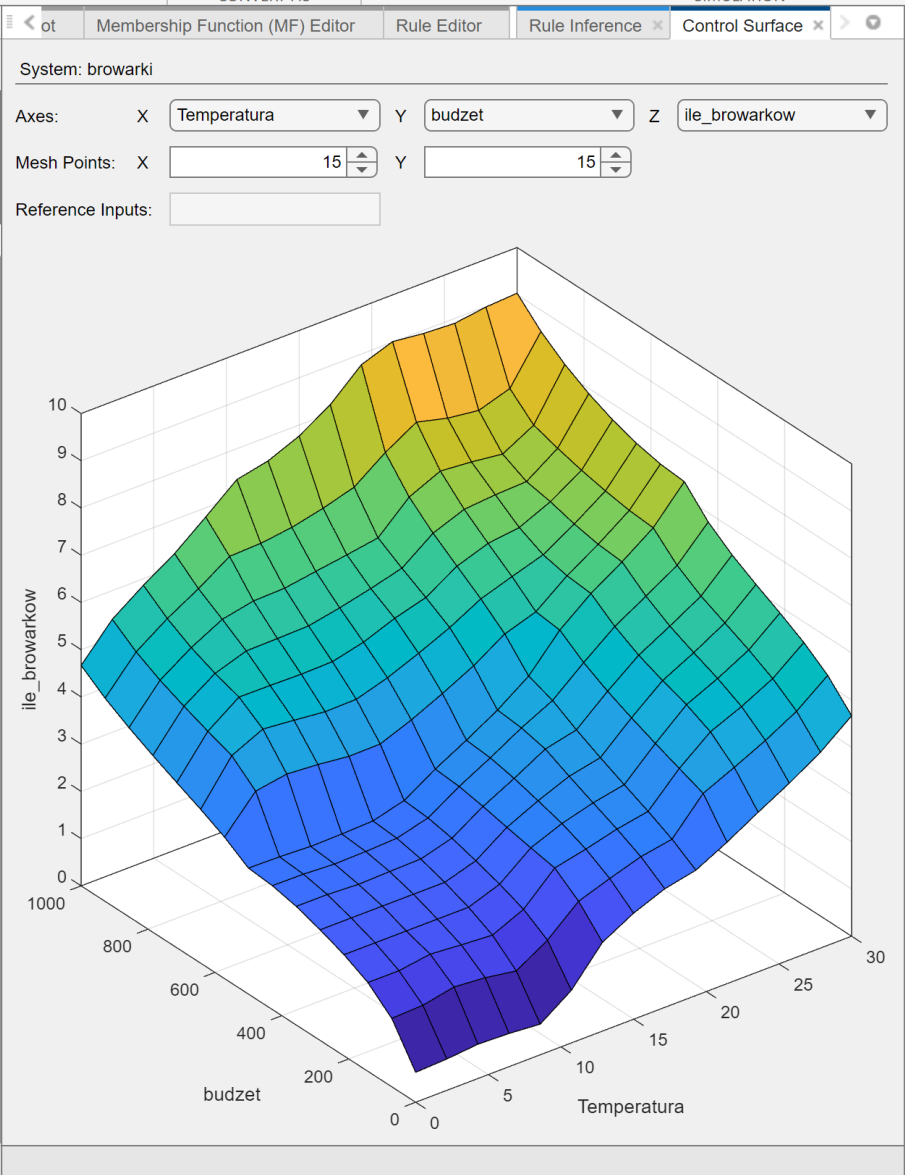
rule5

rule6

rule7

rule8

rule9



PROPERTY EDITOR: OUTPUT

Name

ile_browarkow

Range

[0 10]

Number of MFs: 5

Evenly Distribute MFs

Name	Type	Parameters
BMalo	Triangular	[0 0 2]
Srednio	Triangular	[2 5 7]
BDuzo	Triangular	[7 10 10]
Malo	Triangular	[0 3 5]
Duzo	Triangular	[5 7 10]