

Лабораторна робота №3

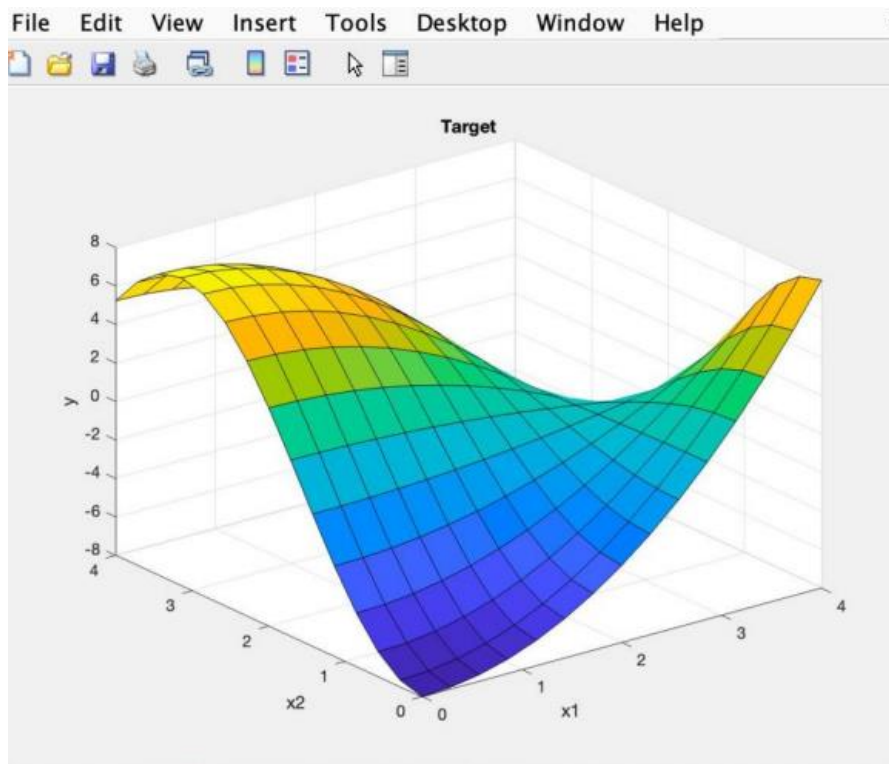
ІПЗ-21-5 Пархомчук Іван

Мета: дослідити можливості ППП MATLAB щодо проектування систем керування на основі алгоритмів нечіткого виводу.

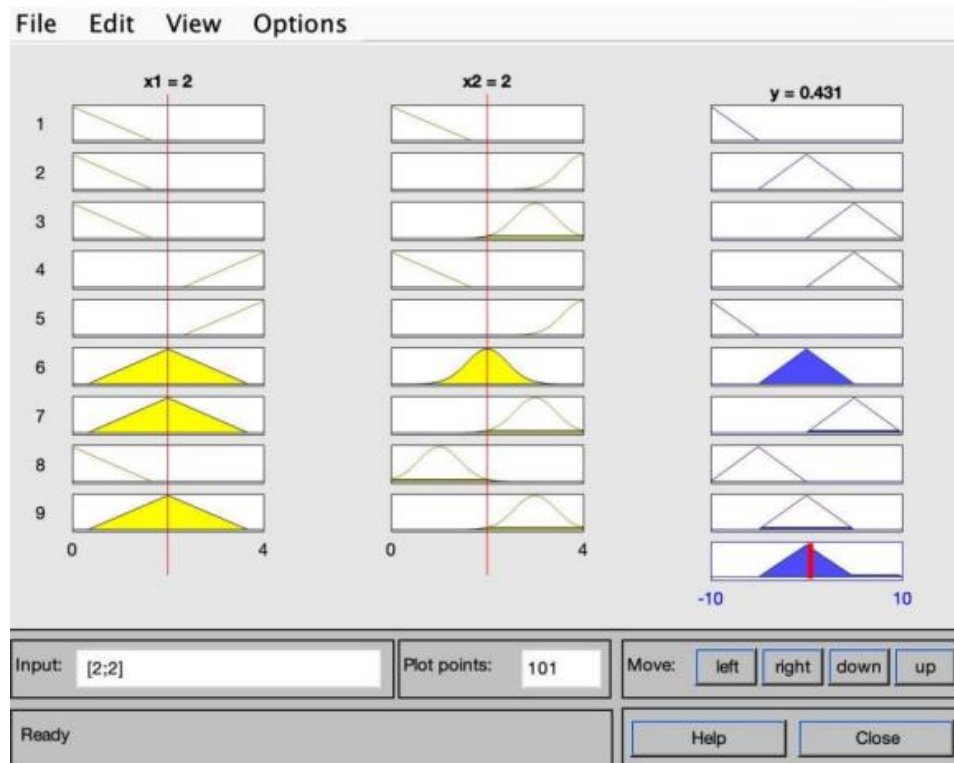
Підготовка, приклад.

За допомогою СНВ зобразити поверхню функції $y = (x_1^2 - 8)\cos(x_2)$ на множині $x_1 \in [0,4]; x_2 \in [0,4]$.

Результат виконання програми



Перегляд правил



Редагування правил

File Edit View Options

1. If (x1 is L) and (x2 is L) then (y is L) (1)
2. If (x1 is L) and (x2 is H) then (y is A) (1)
3. If (x1 is L) and (x2 is HA) then (y is HA) (1)
4. If (x1 is mf3) and (x2 is L) then (y is HA) (1)
5. If (x1 is mf3) and (x2 is H) then (y is L) (1)
6. If (x1 is A) and (x2 is A) then (y is A) (1)
7. If (x1 is A) and (x2 is HA) then (y is HA) (1)
8. If (x1 is L) and (x2 is LA) then (y is LA) (1)
9. If (x1 is A) and (x2 is HA) then (y is A) (1)

If x1 is and x2 is Then y is

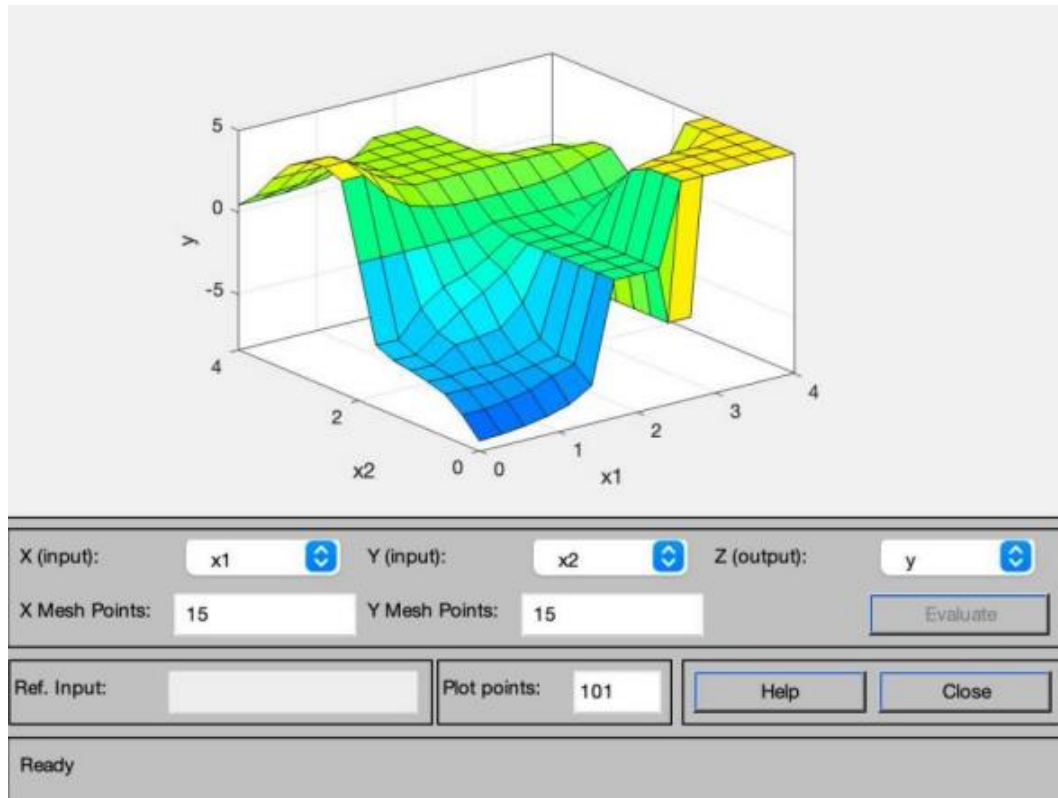
L mf3 mf3
A mf4 L
mf3 LA
none A
HA
H
none

☐ not ☐ not ☐ not

Connection Weight: 1 Delete rule Add rule Change rule << >>

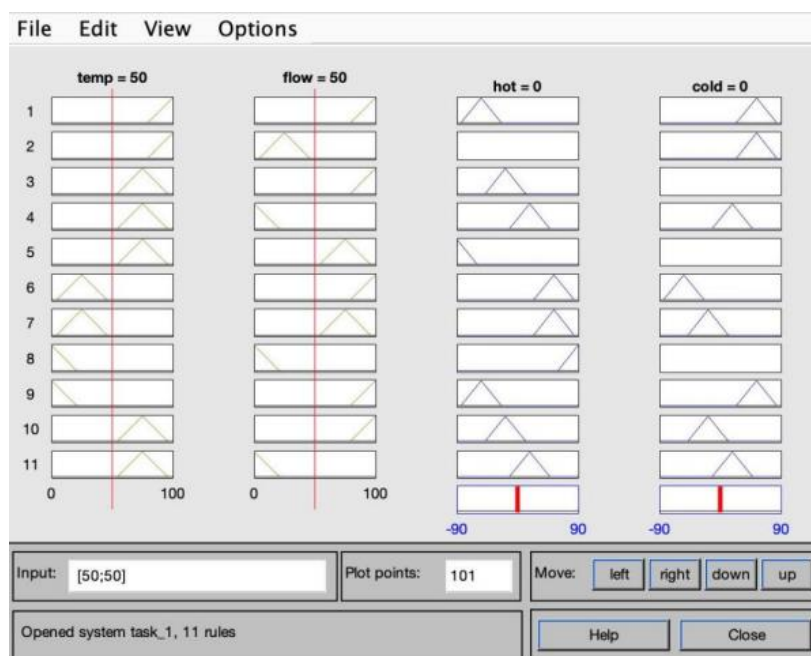
Ready Help Close

Результат виконання



Завдання 1. Побудова нечіткої моделі системи керування кранами гарячої і холодної води

Перегляд правил



Редагування правил

File Edit View Options

1. If (temp is hot) and (flow is strong) then (hot is middle_left)(cold is middle_right) (1)
2. If (temp is hot) and (flow is slightly_weak) then (cold is middle_right) (1)
3. If (temp is slightly_hot) and (flow is strong) then (hot is slightly_left) (1)
4. If (temp is slightly_hot) and (flow is weak) then (hot is slightly_right)(cold is slightly_right) (1)
5. If (temp is slightly_hot) and (flow is slightly_strong) then (hot is left) (1)
6. If (temp is slightly_cold) and (flow is strong) then (hot is middle_right)(cold is middle_left) (1)
7. If (temp is slightly_cold) and (flow is slightly_strong) then (hot is middle_right)(cold is slightly_left) (1)
8. If (temp is cold) and (flow is weak) then (hot is right) (1)
9. If (temp is cold) and (flow is strong) then (hot is middle_left)(cold is middle_right) (1)
10. If (temp is slightly_hot) and (flow is strong) then (hot is slightly_left)(cold is slightly_left) (1)
11. If (temp is slightly_hot) and (flow is weak) then (hot is slightly_right)(cold is slightly_right) (1)

If temp is and flow is Then hot is and cold is

cold
slightly_cold
slightly_hot
hot
none

weak
slightly_weak
slightly_strong
strong
none

left
middle_left
slightly_left
slightly_right
middle_right
right
none

left
middle_left
slightly_left
slightly_right
middle_right
right
none

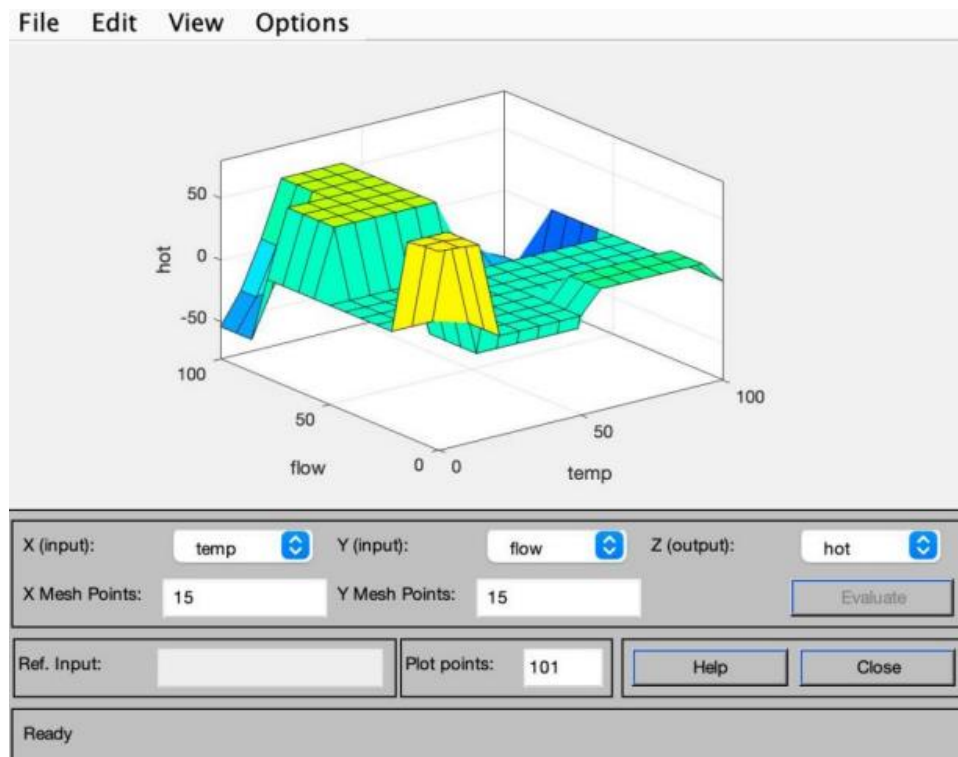
☐ not ☐ not ☐ not ☐ not

Connection: ☐ or ☒ and Weight: 1

Delete rule Add rule Change rule << >>

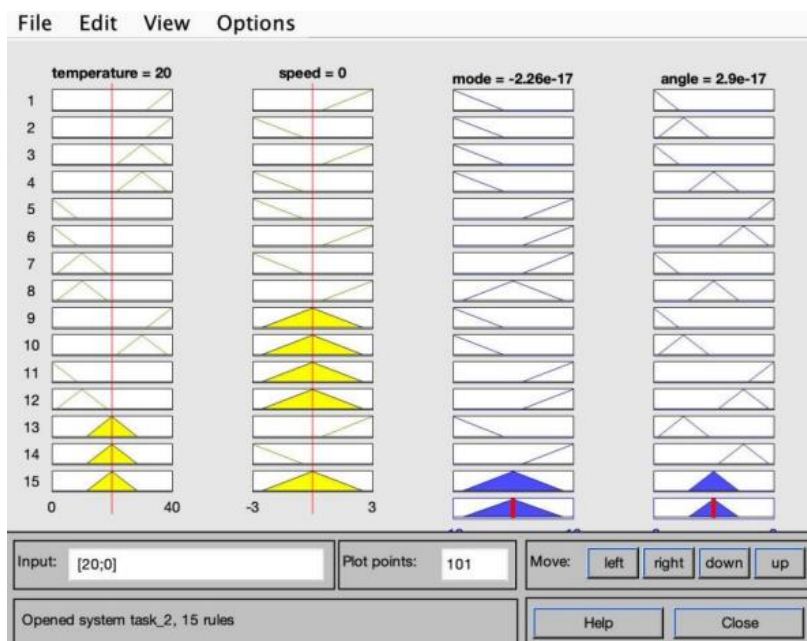
FIS Name: task_1 Help Close

Результат виконання програми



Завдання 2. Нечітка модель керування кондиціонером повітря в приміщенні.

Перегляд правил



Редагування правил

File Edit View Options

1. If (temperature is very_hot and (speed is positive) then (mode is cold)(angle is left) (1)
2. If (temperature is very_hot and (speed is negative) then (mode is cold)(angle is slightly_left) (1)
3. If (temperature is hot and (speed is positive) then (mode is cold)(angle is left) (1)
4. If (temperature is hot and (speed is negative) then (mode is cold)(angle is off) (1)
5. If (temperature is very_cold and (speed is negative) then (mode is hot)(angle is right) (1)
6. If (temperature is very_cold and (speed is positive) then (mode is hot)(angle is slightly_right) (1)
7. If (temperature is cold and (speed is negative) then (mode is hot)(angle is left) (1)
8. If (temperature is cold and (speed is positive) then (mode is off)(angle is off) (1)
9. If (temperature is very_hot and (speed is zero) then (mode is cold)(angle is left) (1)
10. If (temperature is hot and (speed is zero) then (mode is cold)(angle is slightly_left) (1)
11. If (temperature is very_cold and (speed is zero) then (mode is hot)(angle is right) (1)
12. If (temperature is cold and (speed is zero) then (mode is hot)(angle is slightly_right) (1)
13. If (temperature is normal and (speed is positive) then (mode is cold)(angle is slightly_left) (1)
14. If (temperature is normal and (speed is negative) then (mode is hot)(angle is slightly_right) (1)
15. If (temperature is normal and (speed is zero) then (mode is off)(angle is off) (1)

If and Then and

temperature is speed is mode is angle is

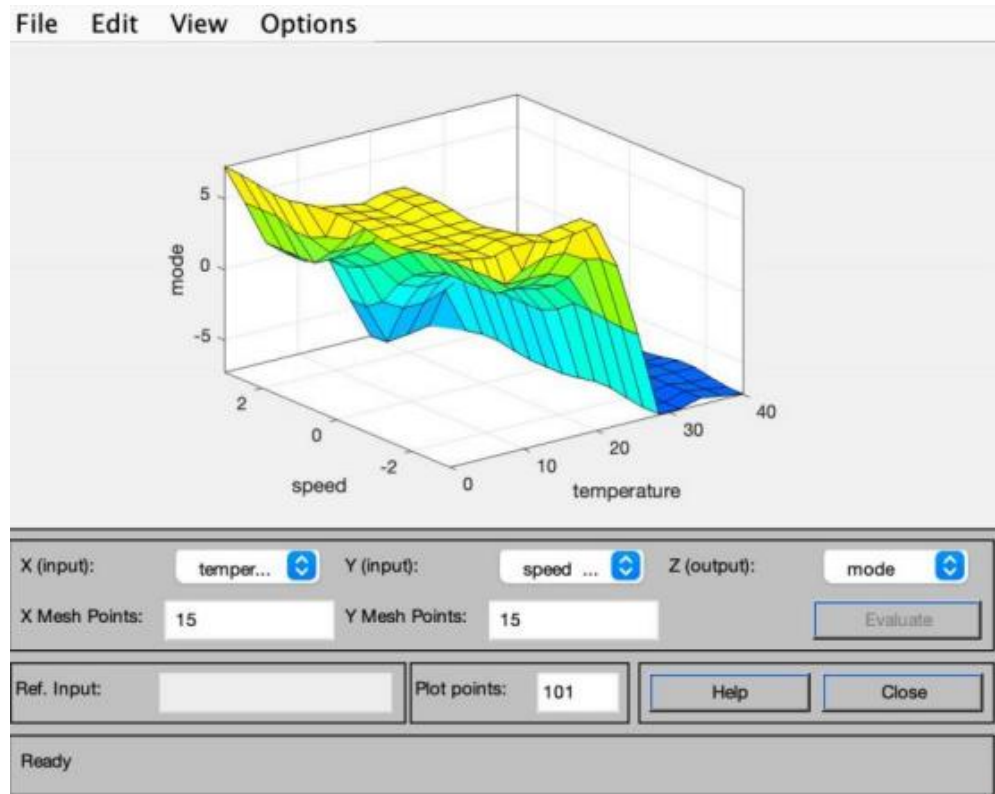
very_cold negative cold left
cold zero off slightly_left
normal positive
hot none
very_hot
none

not not not not

Connection Weight: 1 Delete rule Add rule Change rule << >>

FIS Name: task_2 Help Close

Результат виконання програми



Висновок: дослідив можливості ППП MATLAB щодо проектування систем керування на основі алгоритмів нечіткого виводу.