Fuzzy logic

Matlab
Fuzzy Logic Toolbox

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Introduction

MATLAB Fuzzy Logic Toolbox facilitates the development & simulation of fuzzy-logic systems using:

- **graphical user interface (GUI) tools**
- **command line functionality**
- **simulations with Simulink / Fuzzy Logic Toolbox blockset**

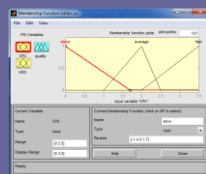**The tool can be used for building, testing and simulating**

- **Fuzzy Expert Systems**
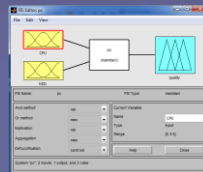- **Adaptive Neuro-Fuzzy Inference Systems (ANFIS)**

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Graphical User Interface Tools

There are five primary GUI tools for building, editing, and observing fuzzy inference systems in the Fuzzy Logic Toolbox:
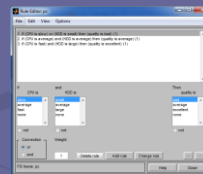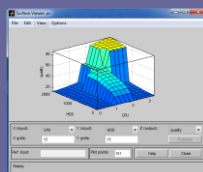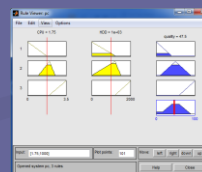
FIS Editor

Membership Function Editor

Rule Editor

Surface Viewer

Rule Viewer

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Graphical User Interface Tools

Fuzzy Inference System (FIS) Editor

FIS structure display (number & names of input and output variables, engine type)

Adjust fuzzy engine methods

Edit names of input and output variables

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Graphical User Interface Tools

Membership Function Editor

Select & edit attributes of membership function

Display & edit universe of current variable

Name & edit parameters of membership function

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Graphical User Interface Tools

Rule Editor

List of rules (automatically updated)

Create and edit rules
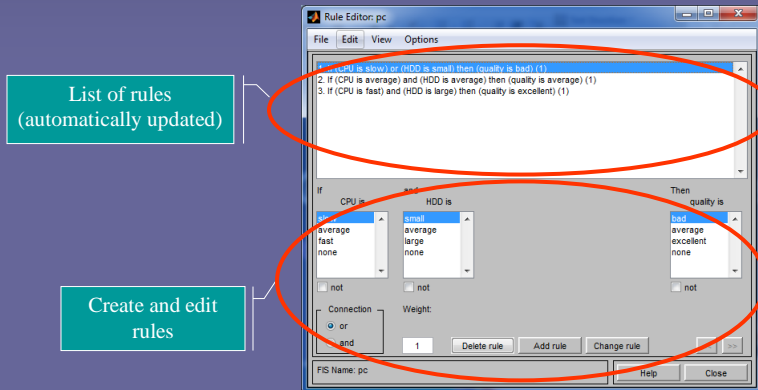
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Graphical User Interface Tools

Rule Viewer

Shows how input variable is used in rules

Output of rules

Aggregated output and defuzzified value (red line)
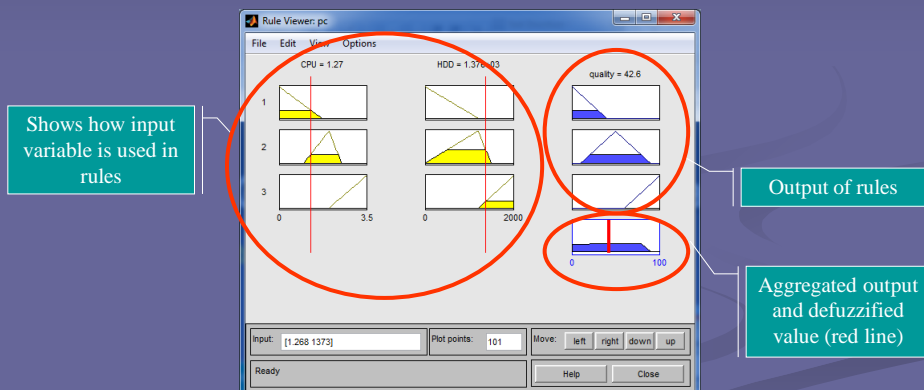
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Graphical User Interface Tools

Surface Viewer

Specify input and output variables to display

Shows output surface for any system output versus any one (or two) inputs
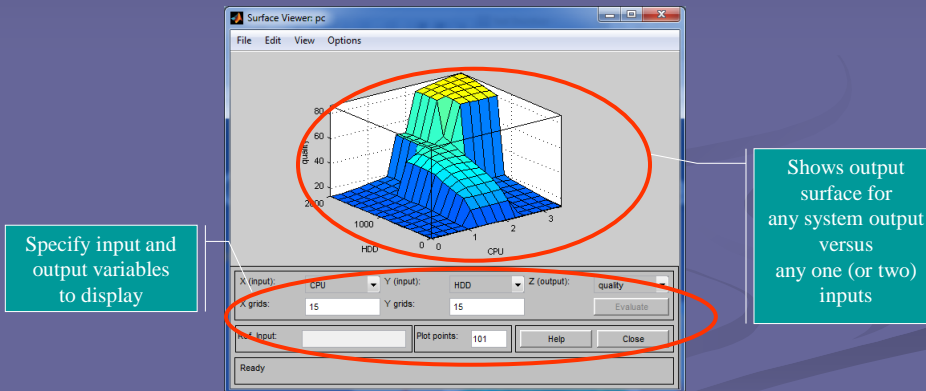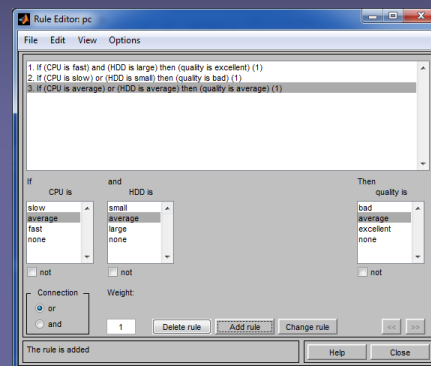
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Example: PC (Configuration Evaluator)
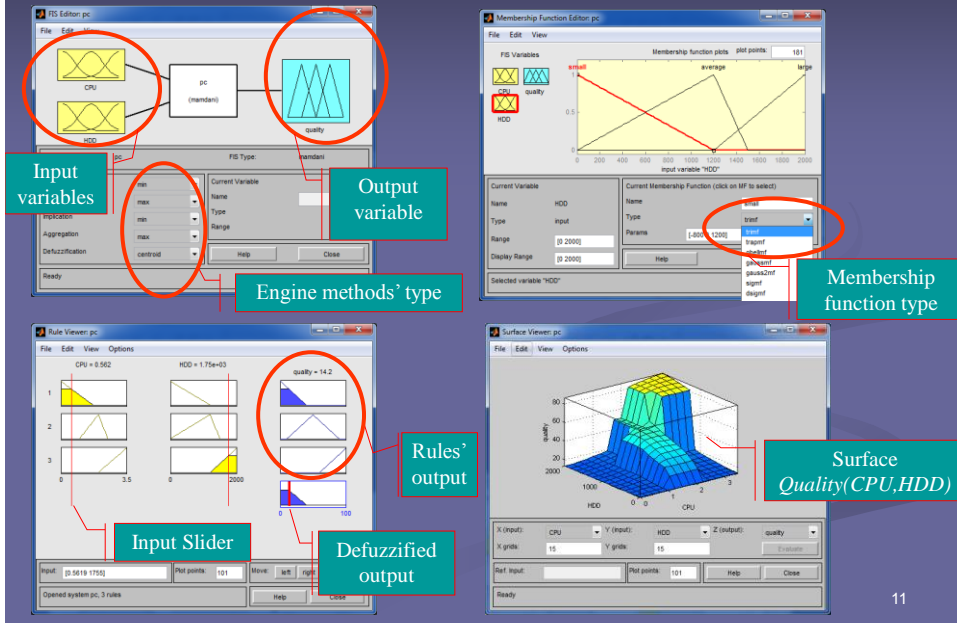
Rules resembling human reasoning:

1. if **CPU** is **FAST** and **HDD** is **LARGE**
    then **QUALITY** is **EXCELLENT**

2. If **CPU** is **SLOW** or **HDD** is **SMALL**
    then **QUALITY** is **BAD**

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3. If **CPU** is **AVERAGE** and **HDD** is **AVERAGE**
    then **QUALITY** is **AVERAGE**

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Example: PC (Configuration Evaluator)