



Matlab Fuzzy Toolkit Example

10th October 2006

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Introduction

- MATLAB fuzzy logic toolbox facilitates the development of fuzzy-logic systems using:
 - graphical user interface (GUI) tools
 - command line functionality
- The tool can be used for building
 - Fuzzy Expert Systems
 - Adaptive Neuro-Fuzzy Inference Systems (ANFIS)

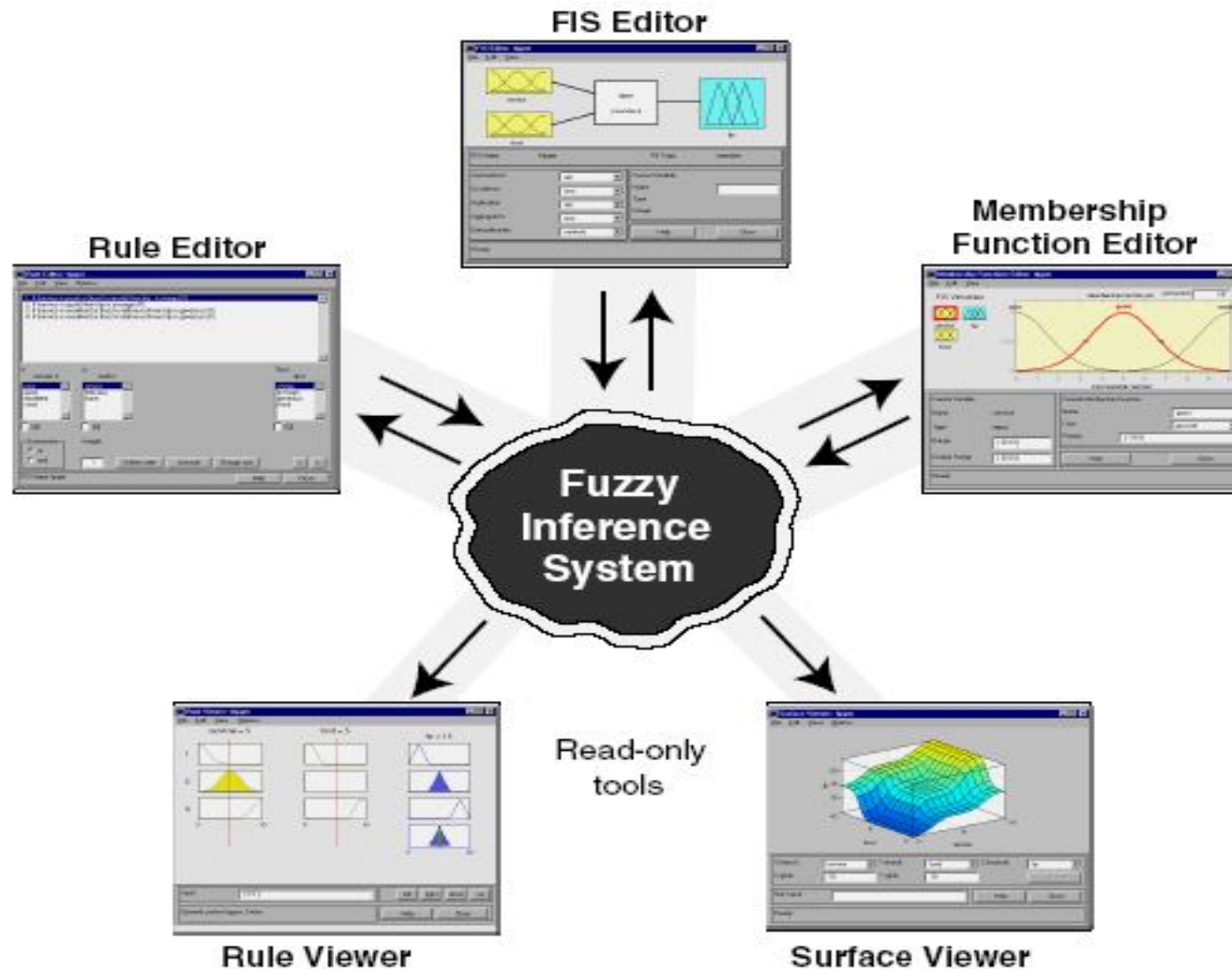


Graphical User Interface (GUI) Tools

- There are five primary GUI tools for building, editing, and observing fuzzy inference systems in the Fuzzy Logic Toolbox:
 - Fuzzy Inference System (FIS) Editor
 - Membership Function Editor
 - Rule Editor
 - Rule Viewer
 - Surface Viewer



Graphical User Interface (GUI) Tools





Graphical User Interface (GUI) Tools

Fuzzy Inference System (FIS) Editor

Define number of input and output variables

Adjust fuzzy inference functions

Name and edit names of input, output variables

FIS Editor: tipper

File Edit View

service

food

tipper (mamdani)

tip

FIS Name: tipper FIS Type: mamdani

And method: min

Or method: max

Implication: min

Aggregation: max

Defuzzification: centroid

Current Variable

Name: service

Type: input

Range: [0 10]

Help Close

System "tipper": 2 inputs, 1 output, and 3 rules

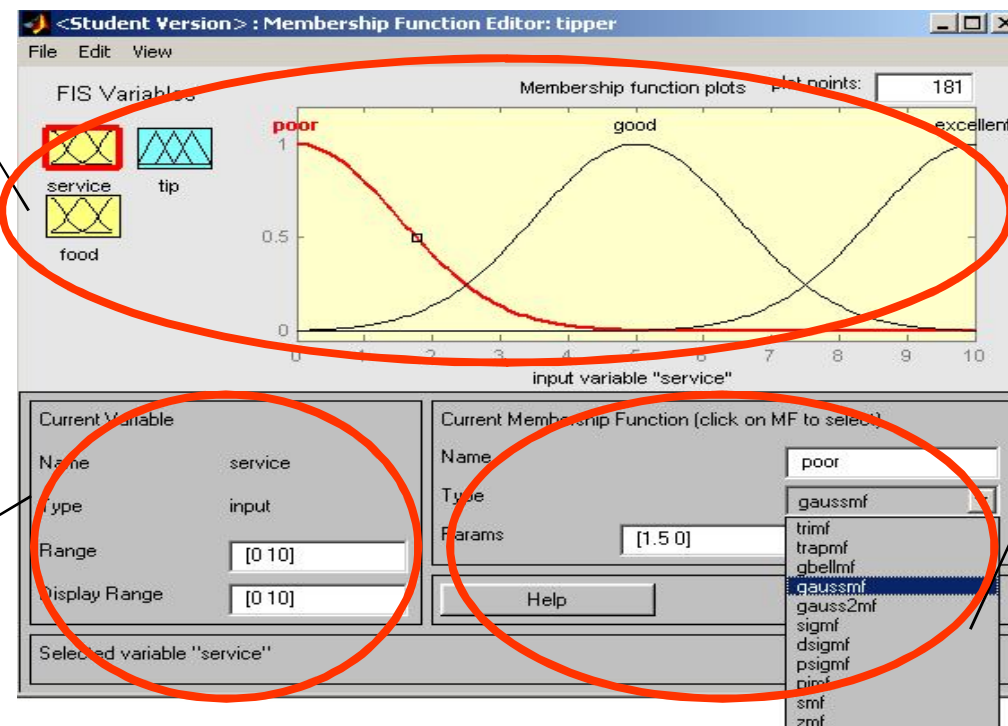


Graphical User Interface (GUI) Tools

Membership Function Editor

Select & edit attributes of membership function

Display & edit values of current variable



Name & edit parameters of membership function



Graphical User Interface (GUI) Tools

Rule Editor

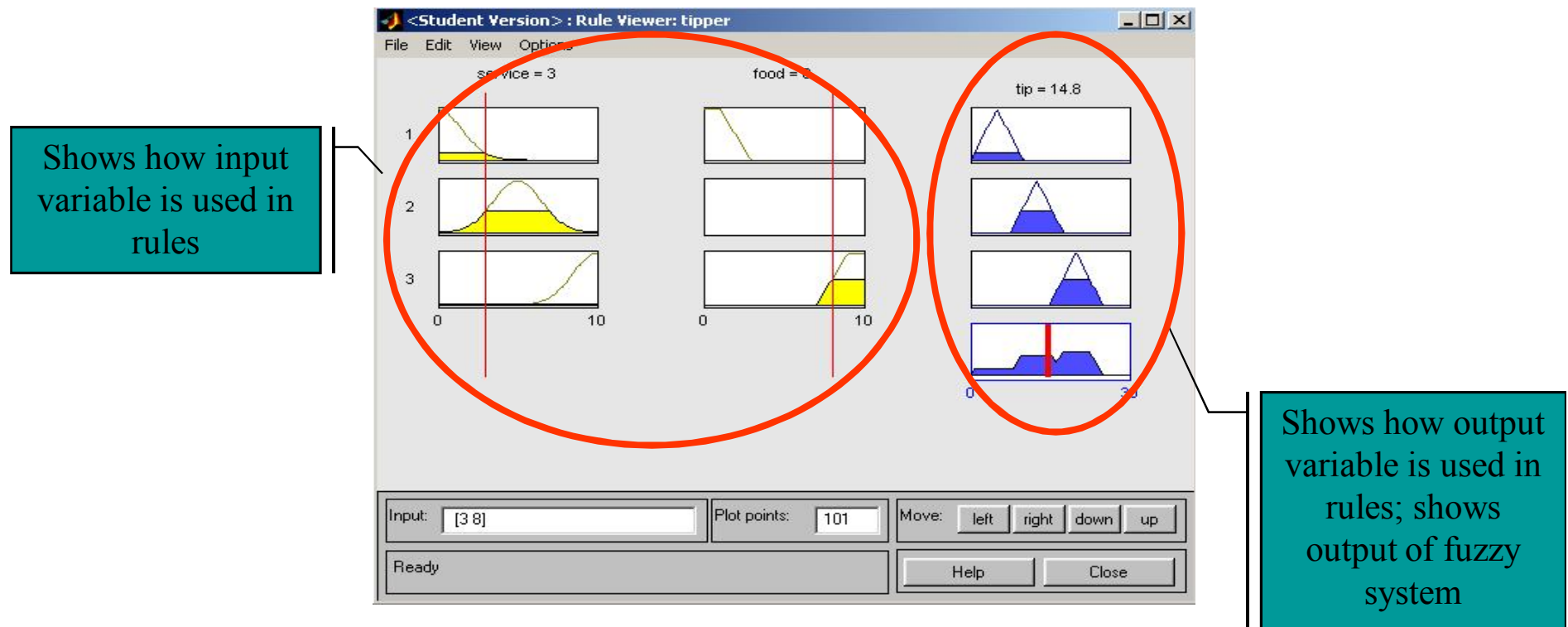
Rules – automatically updated

Create and edit rules



Graphical User Interface (GUI) Tools

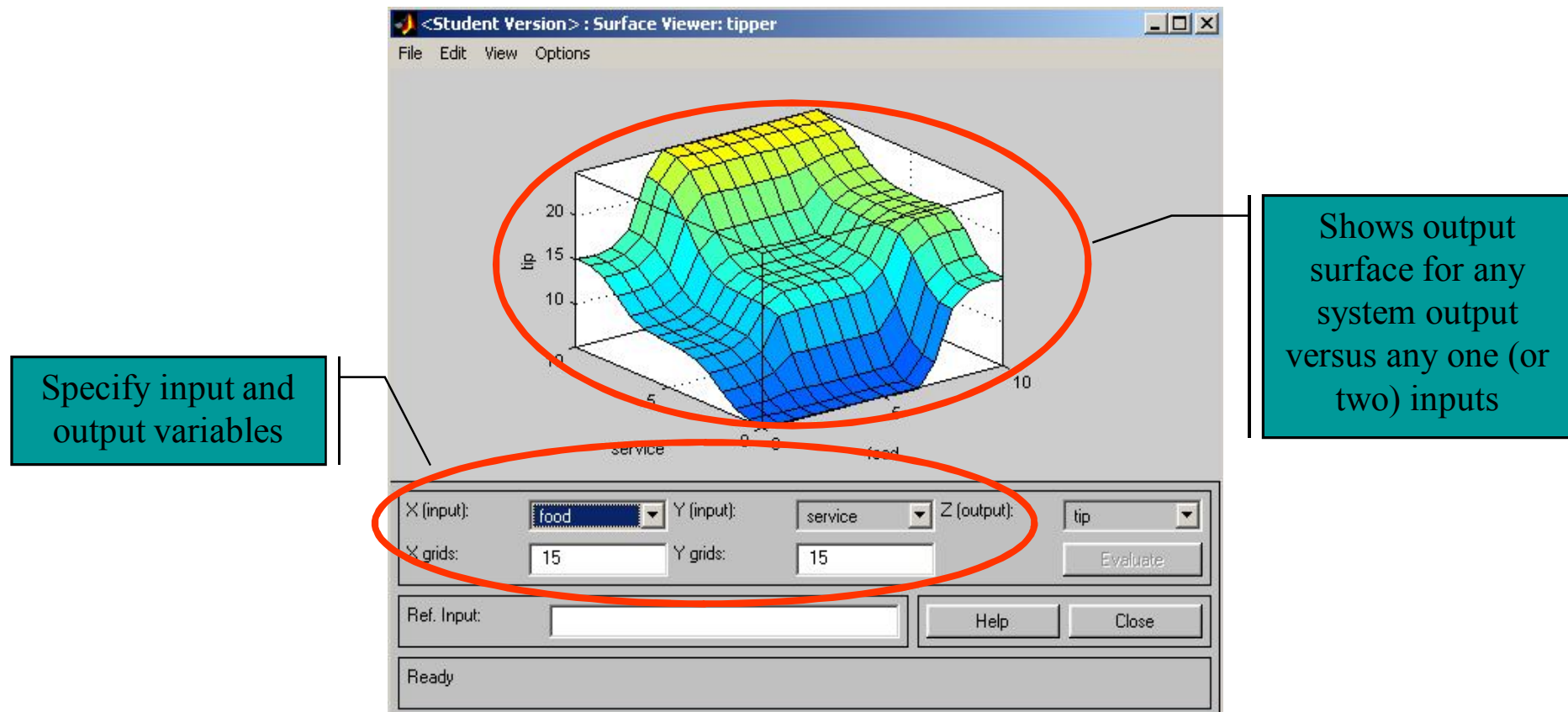
Rule Viewer





Graphical User Interface (GUI) Tools

Surface Viewer



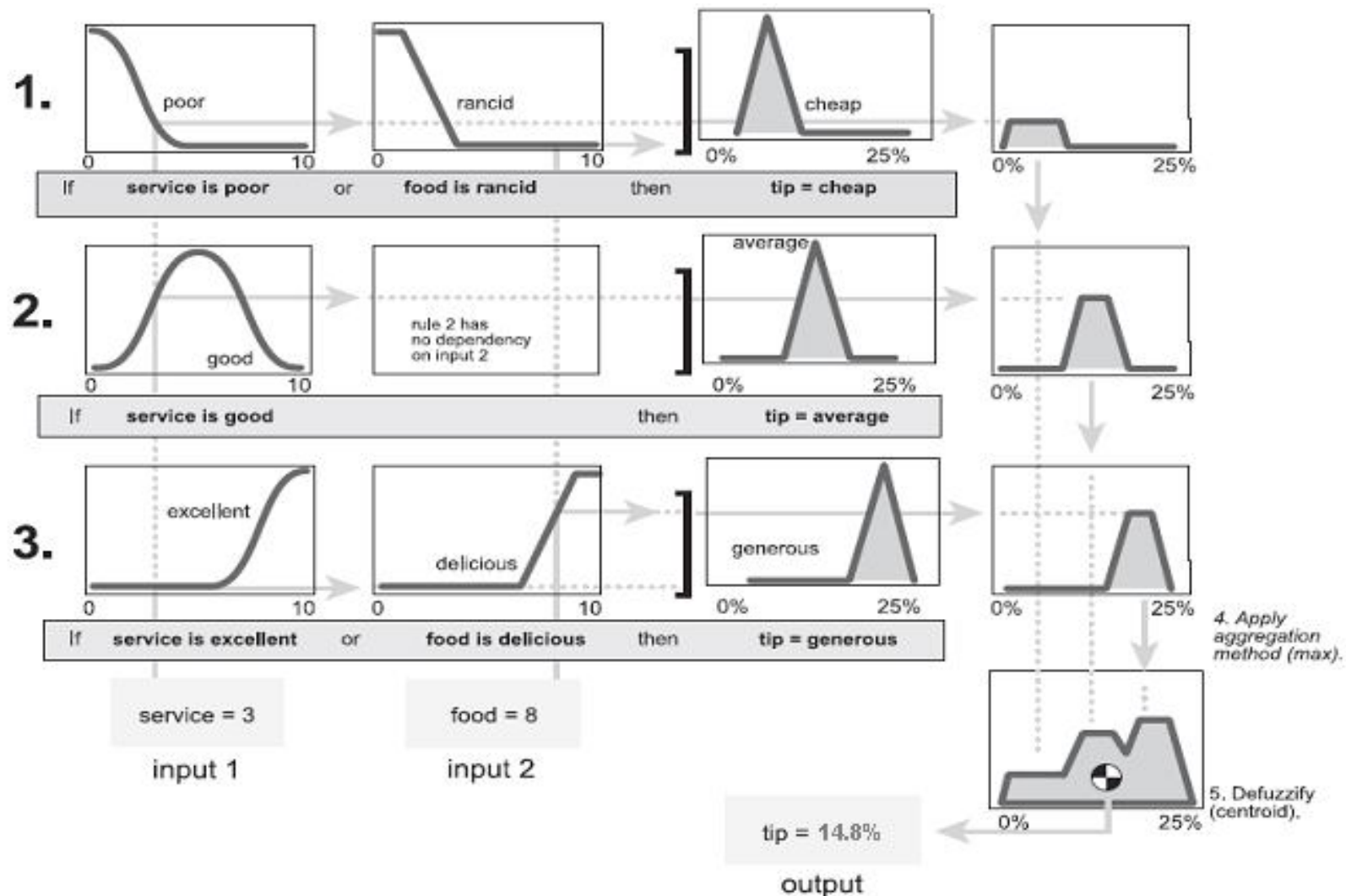


Example: Dinner for Two

- Golden rules for tipping:
 1. IF the service is poor OR the food is rancid
THEN tip is cheap (5%).
 2. IF the service is good
THEN tip is average (15%).
 3. IF the service is excellent OR the food is delicious
THEN tip is generous (25%).



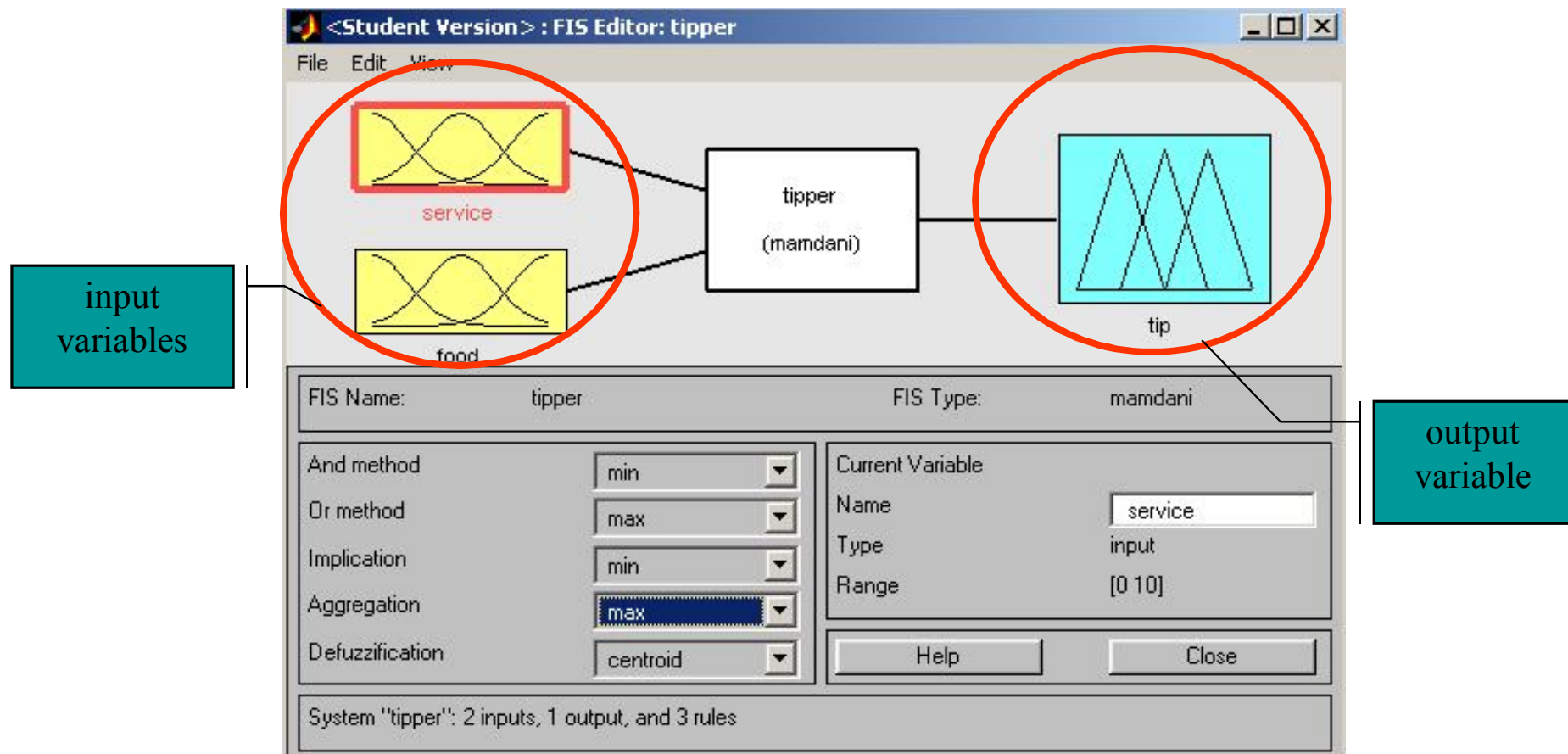
Example: Dinner for Two





Example: Dinner for Two

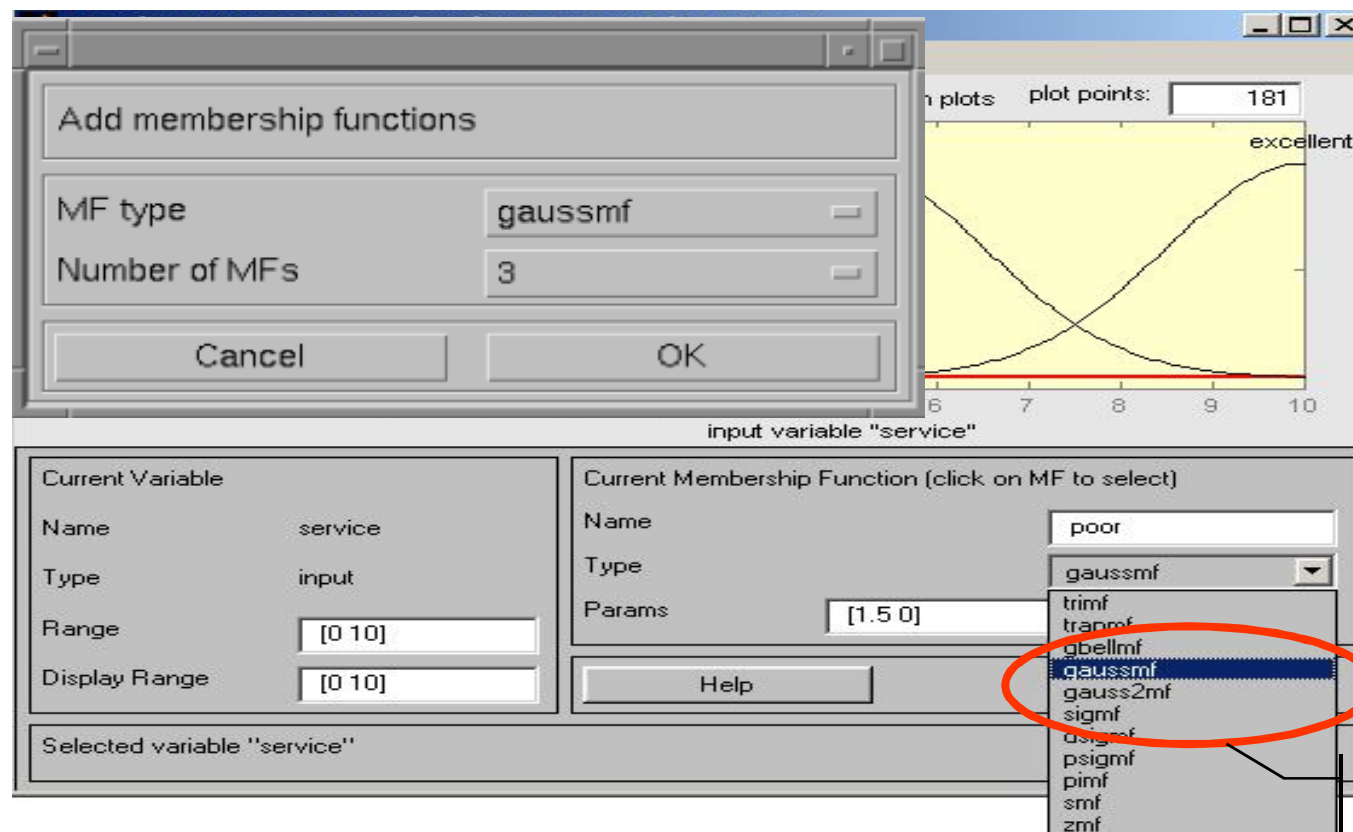
Fuzzy Inference System (FIS) Editor





Example: Dinner for Two

Membership Function Editor

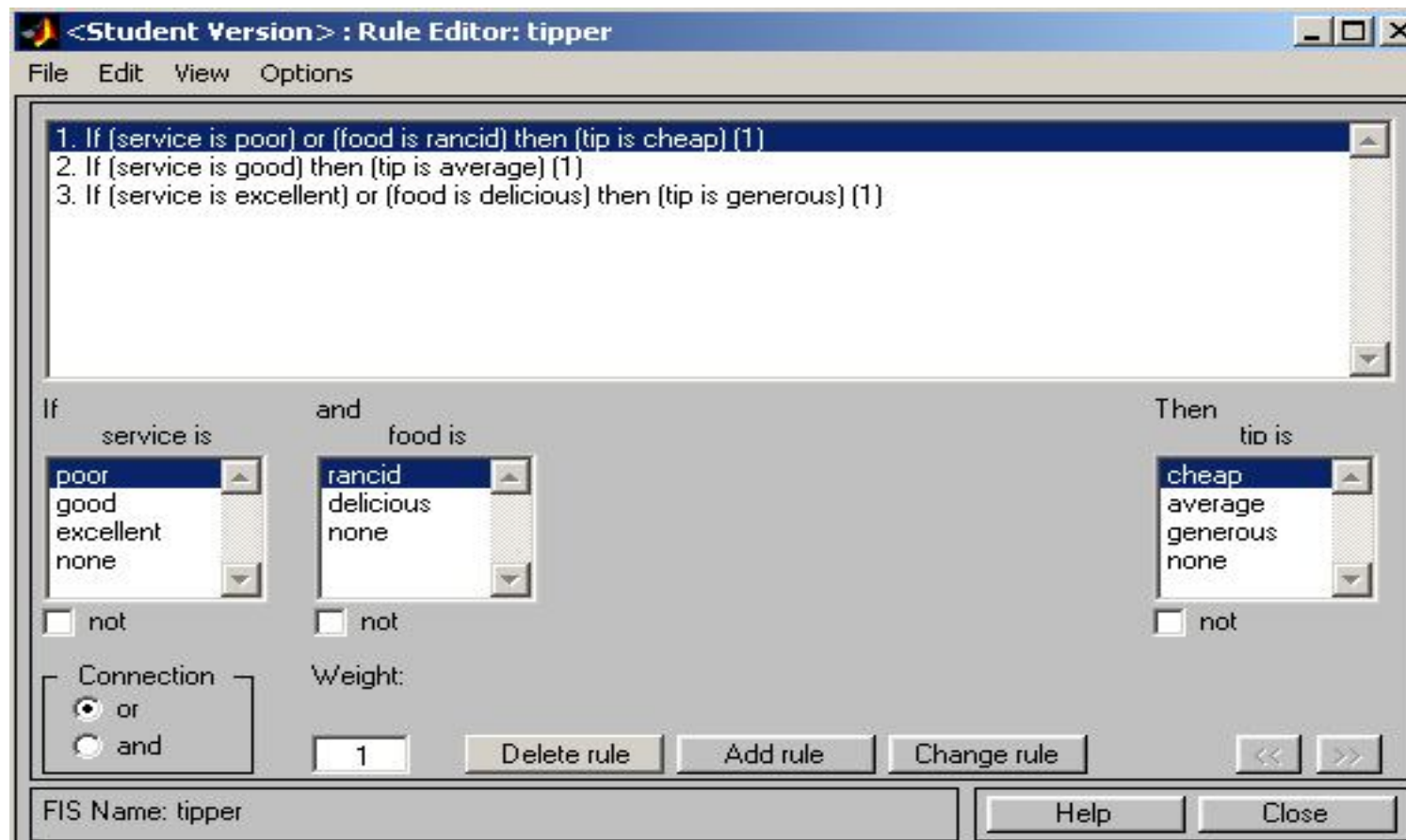


Select type of
membership
function



Example: Dinner for Two

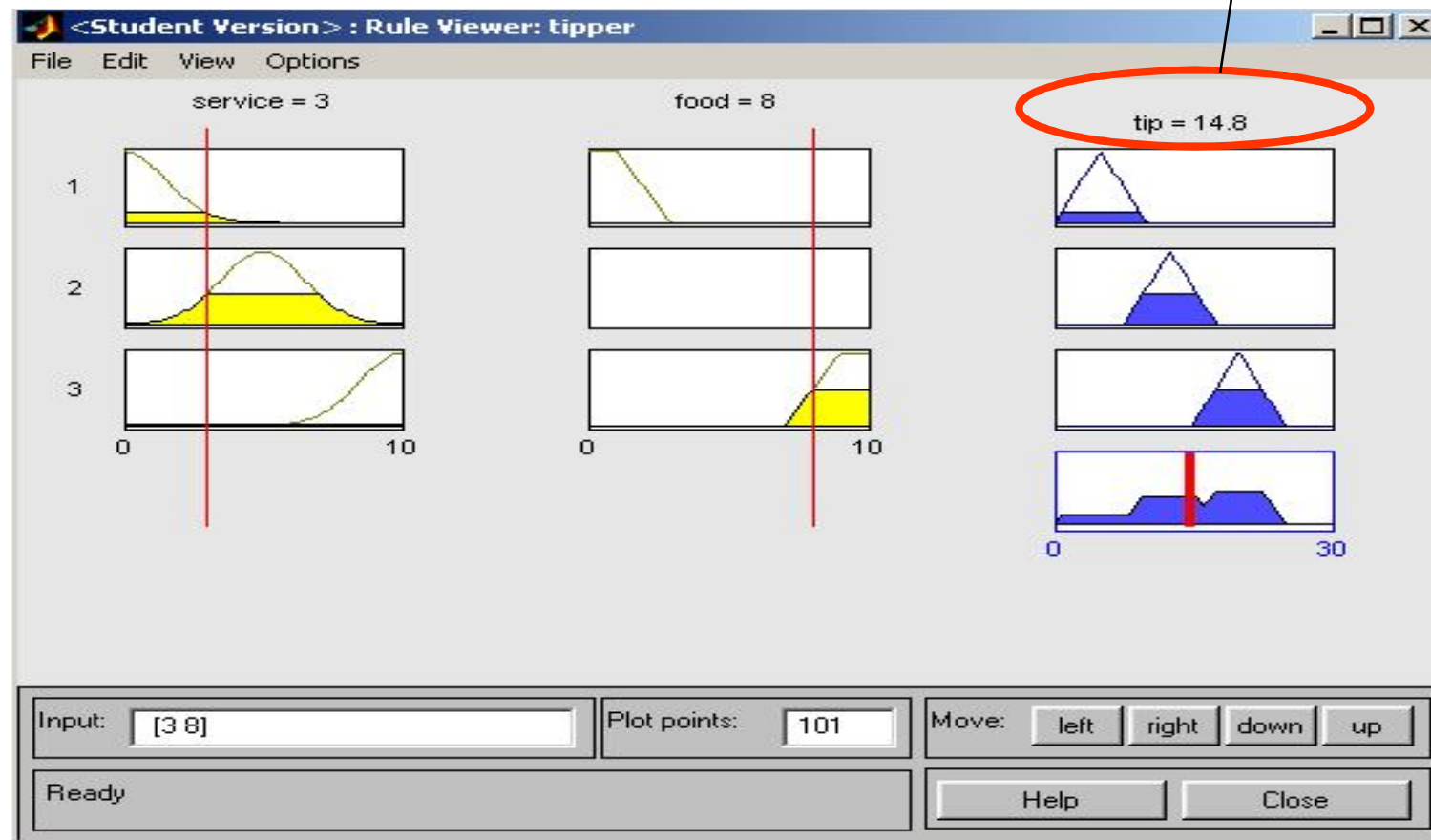
Rule Editor





Example: Dinner for Two

Rule Viewer





Example: Dinner for Two

Surface Viewer

