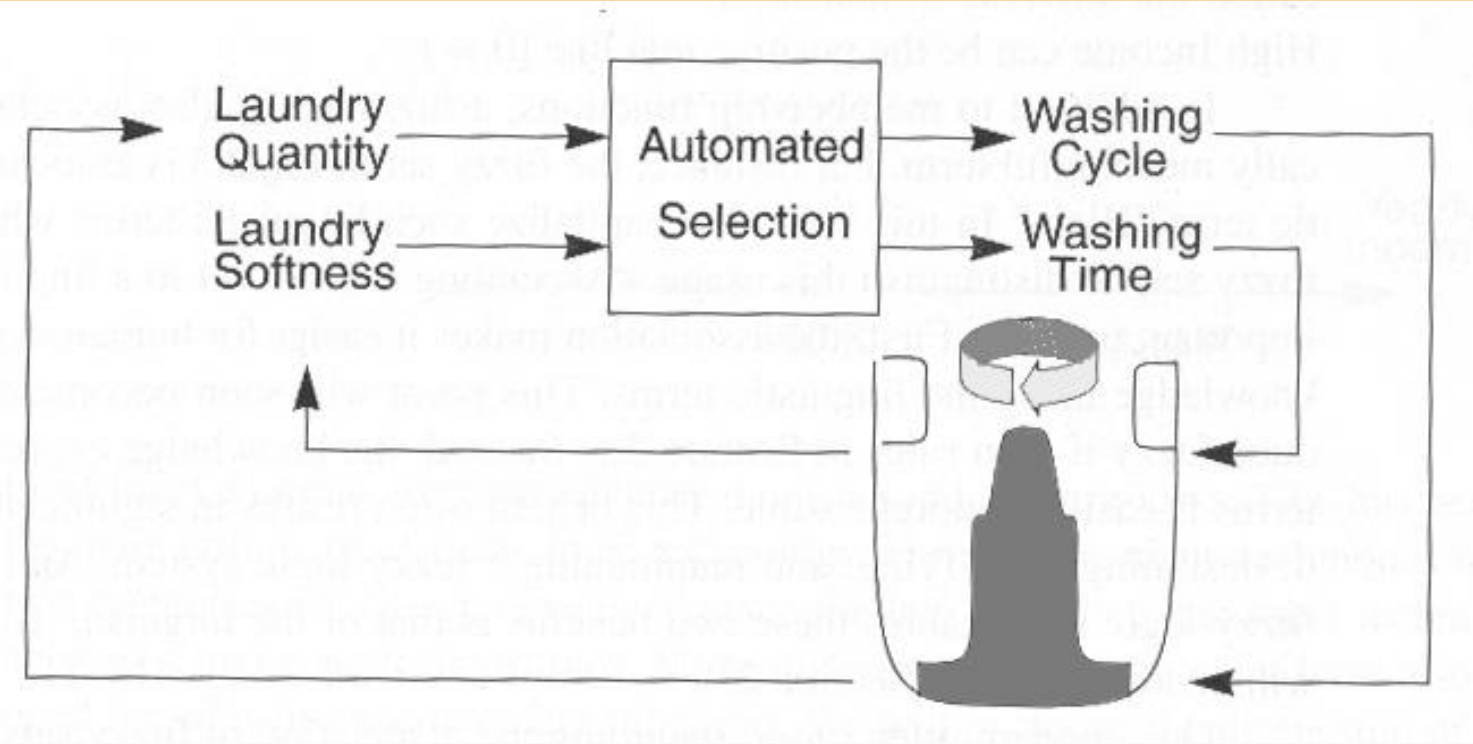
Fully Automatic Washing Machine



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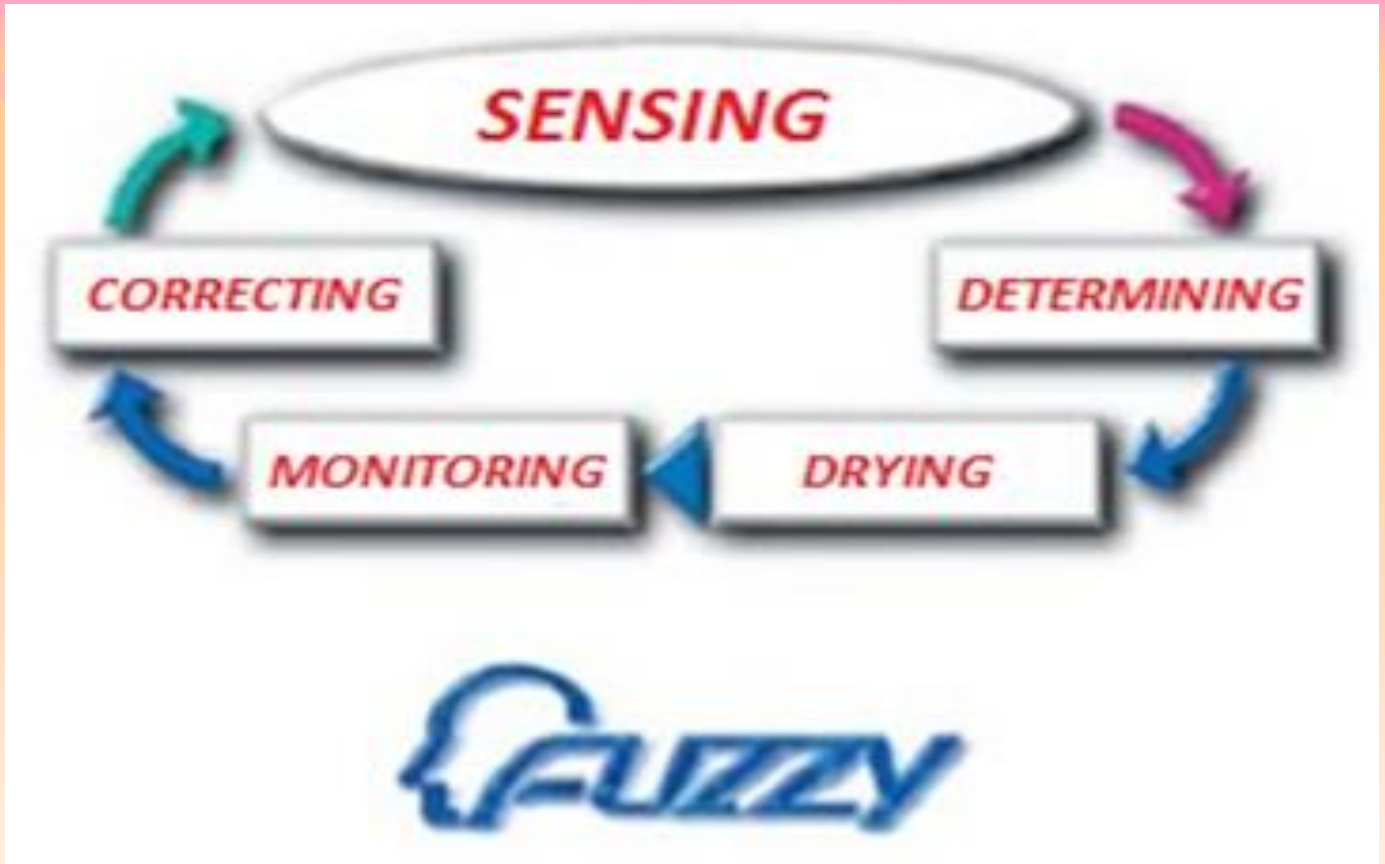

- Sensors continually monitor varying conditions inside the machine and accordingly adjust operations for the best wash results.
- As there is no standard for fuzzy logic, different machines perform in different manners.

Control the Washing Process

- Fuzzy logic controls the washing process,
  - **water intake**
  - **water temperature**
  - **wash time**
  - **rinse performance**
  - and **spin speed**

Automatic WM Functions

- More sophisticated machines weigh the load (so you can't overload the washing machine)
- Advise on the required amount of detergent.
- Assess cloth material type and water hardness
- Check whether the detergent is in powder or liquid form.
- Some machines even learn from **past experience**, **memorising programs** and adjusting them to **minimize running costs**.

Automatic WM Feature

- Most fuzzy logic machines feature '**onetouch control**.'
- Equipped with energy saving features, these consume less power and are worth paying extra for if you wash full loads more then three times a week.
- Inbuilt sensors monitor the washing process and make corrections to produce the best washing results.

Automatic WM Feature…..

- The **fuzzy logic** checks for the extent of dirt and grease.
- the amount of soap and water to add, direction of spin, and so on.
- The machine rebalances washing load to ensure correct spinning.
- Else, it reduces spinning speed if an imbalance is detected. Even distribution of washing load reduces spinning noise.
- **Neuro fuzzy logic** incorporates optical sensors to sense the dirt in water and a **fabric sensor** to detect the type of fabric and accordingly adjust wash cycle.

Example: Fully Automatic Washing Machine

- Inputs
  - —Laundry Softness
  - —Laundry Quantity
- Outputs
  - —Washing Cycle
  - —Washing Time

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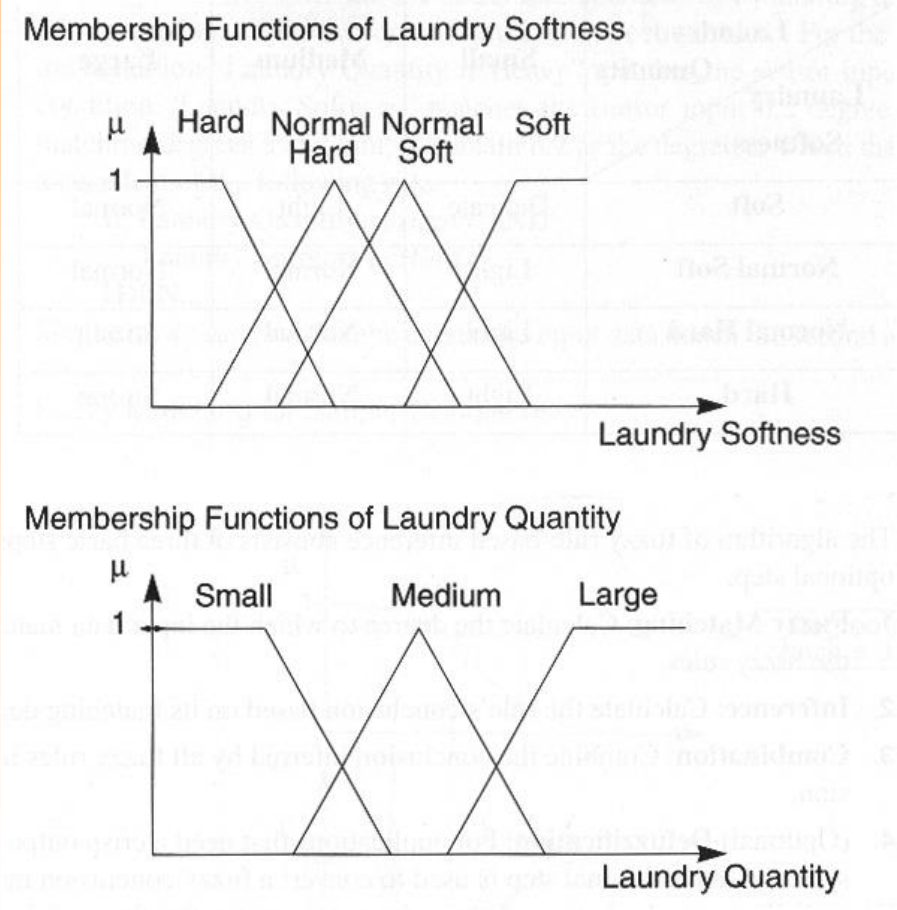
Example: Input Membership functions



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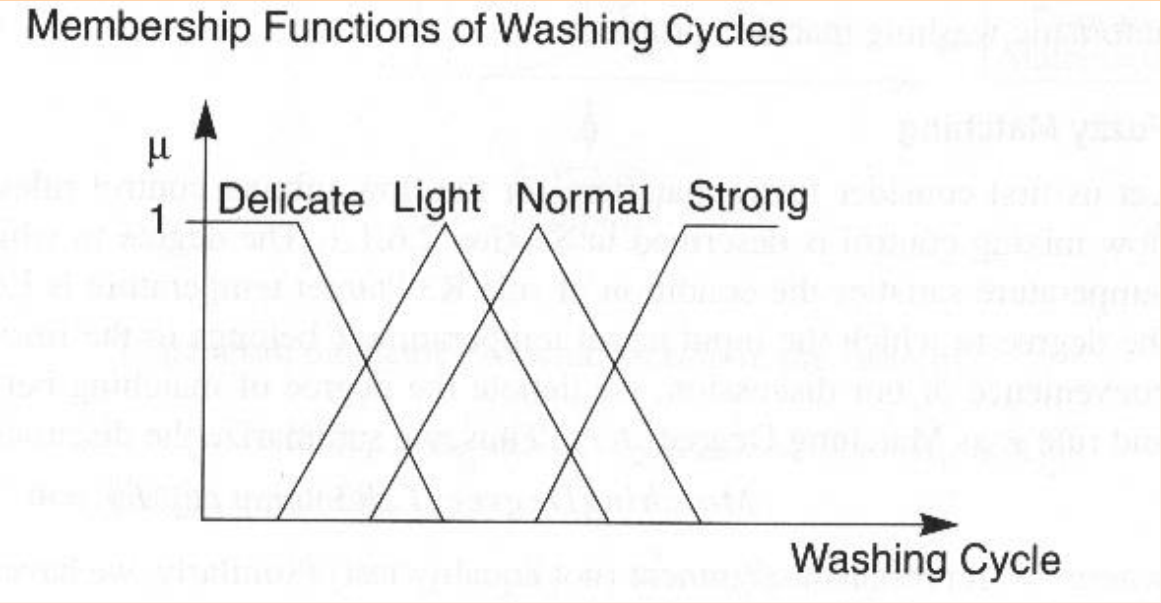
Example: Output Membership functions



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Example: Fuzzy Rules for Washing Cycle

Softness \ Quantity	Small	Medium	Large
Soft	Delicate	Light	Normal
Normal Soft	Light	Normal	Normal
Normal Hard	Light	Normal	Strong
Hard	Light	Normal	Strong

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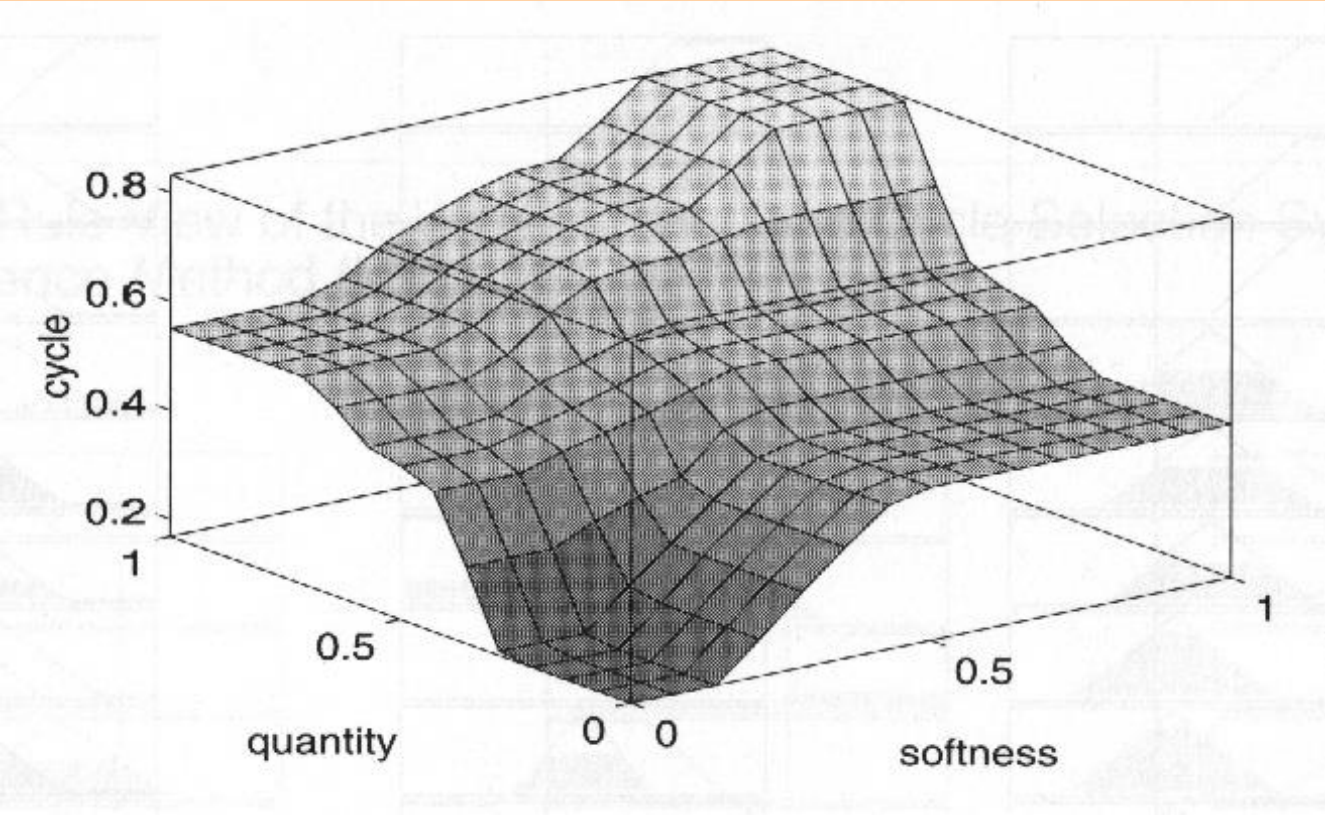
Example: Control Surface View (Clipping)



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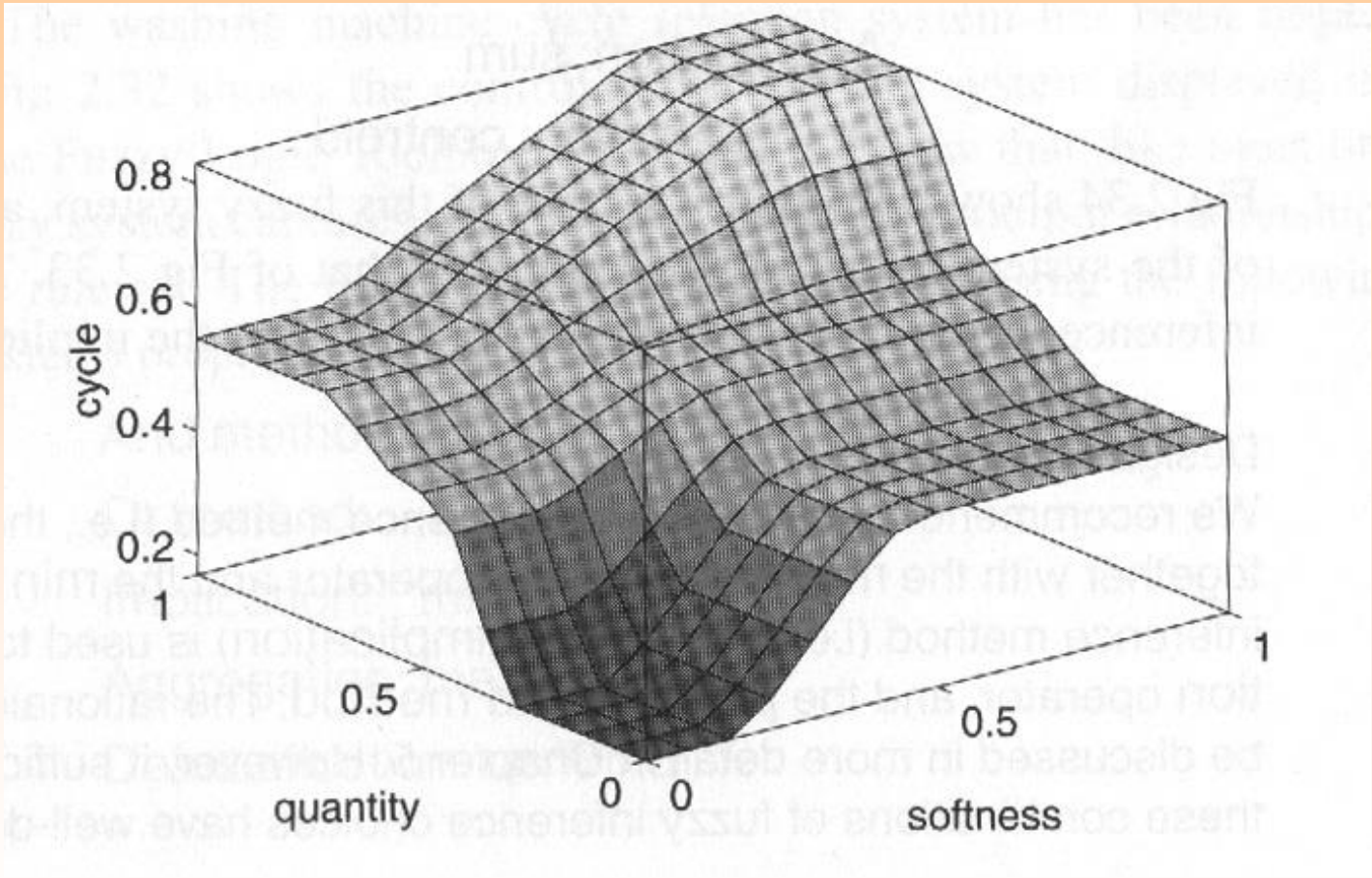
Example: Control Surface View (Scaling)



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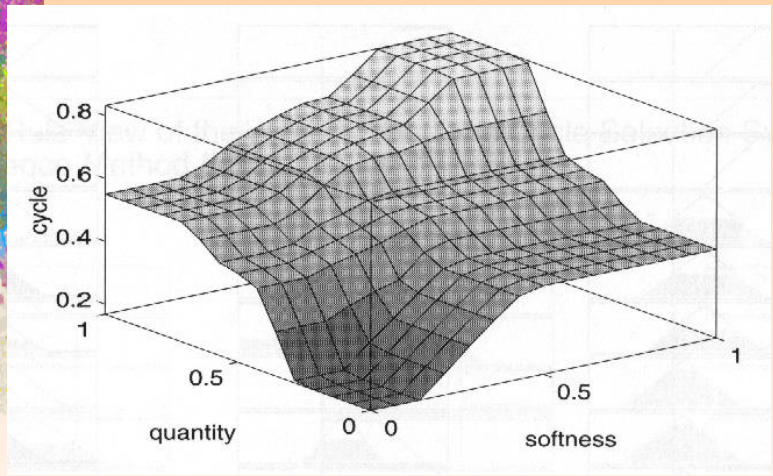
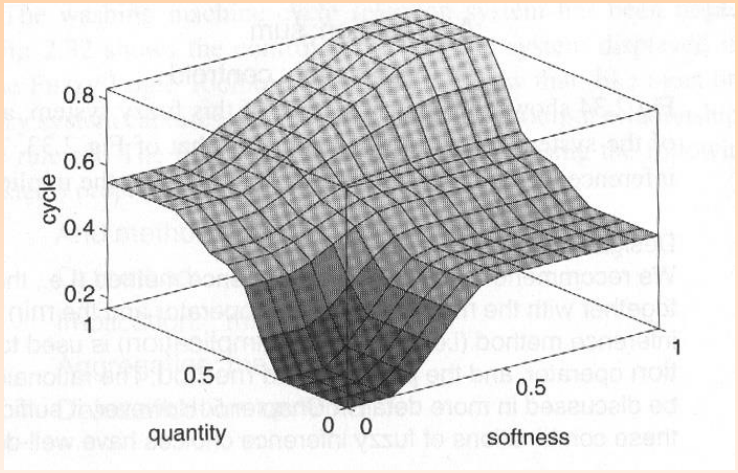
Example: Control Surface View



Clipping



Scaling

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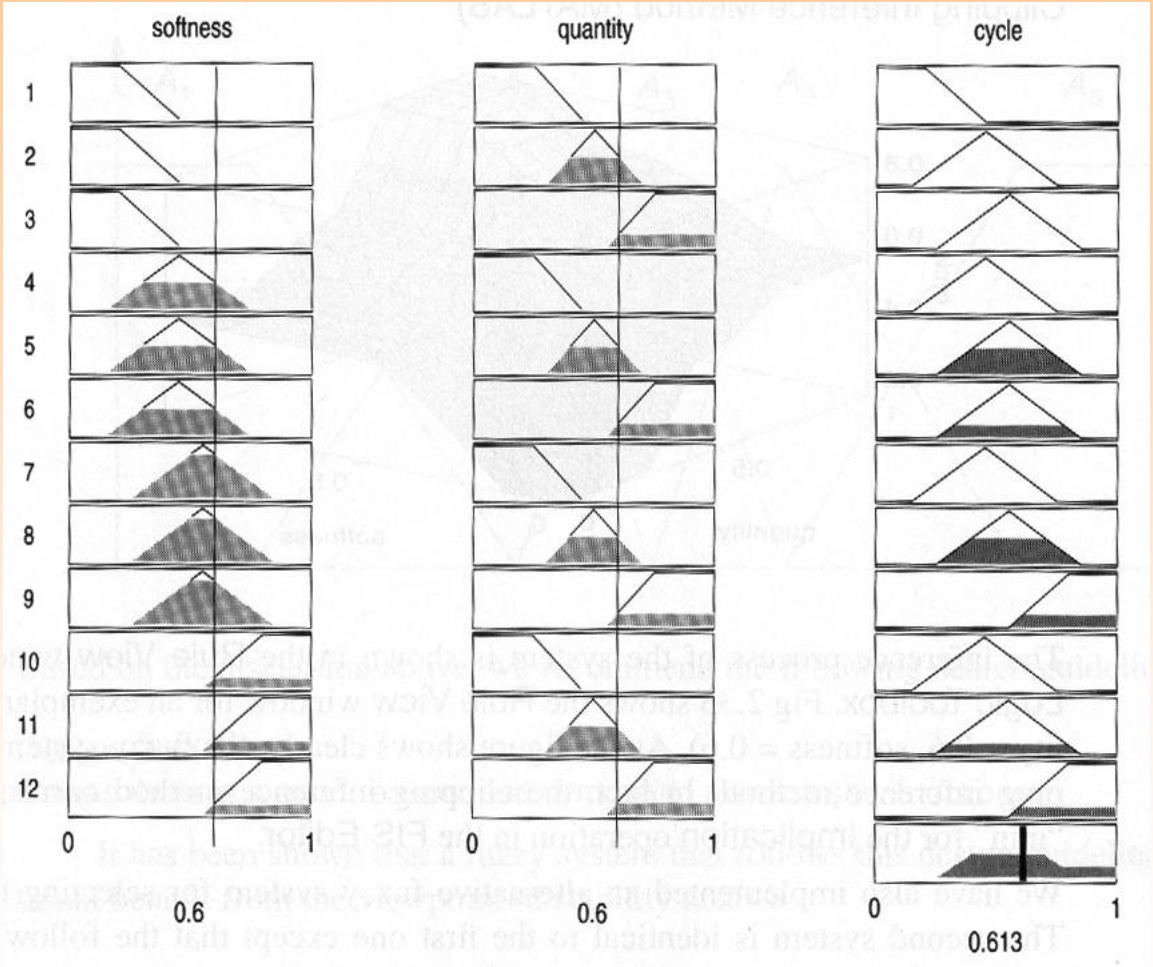
Example: Rule View (Clipping)



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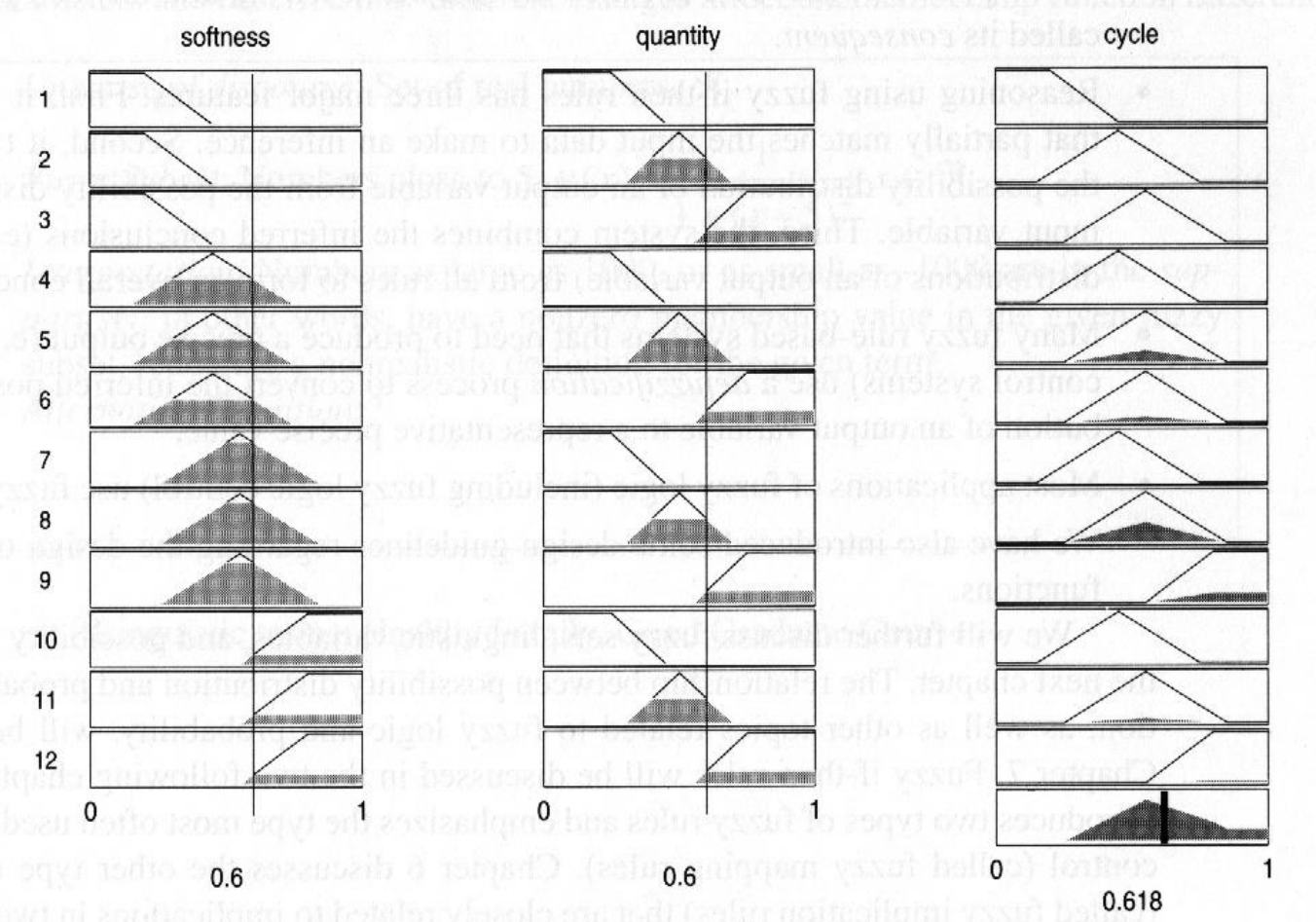
Example: Rule View (Scaling)



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