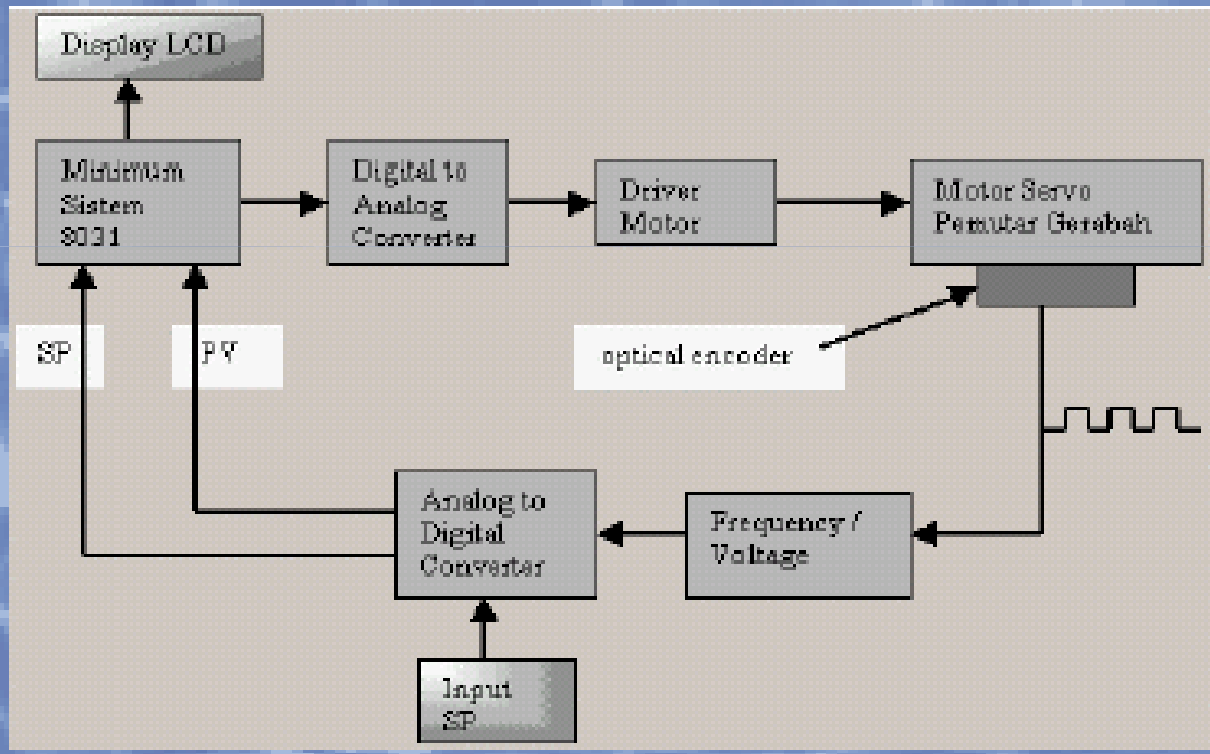
Fuzzy Logic Controller

Intelligent System course

Motivation

- To control the speed of DC motor with Fuzzy Logic
- To implement Fuzzy Logic in microcontroller

Block Diagram



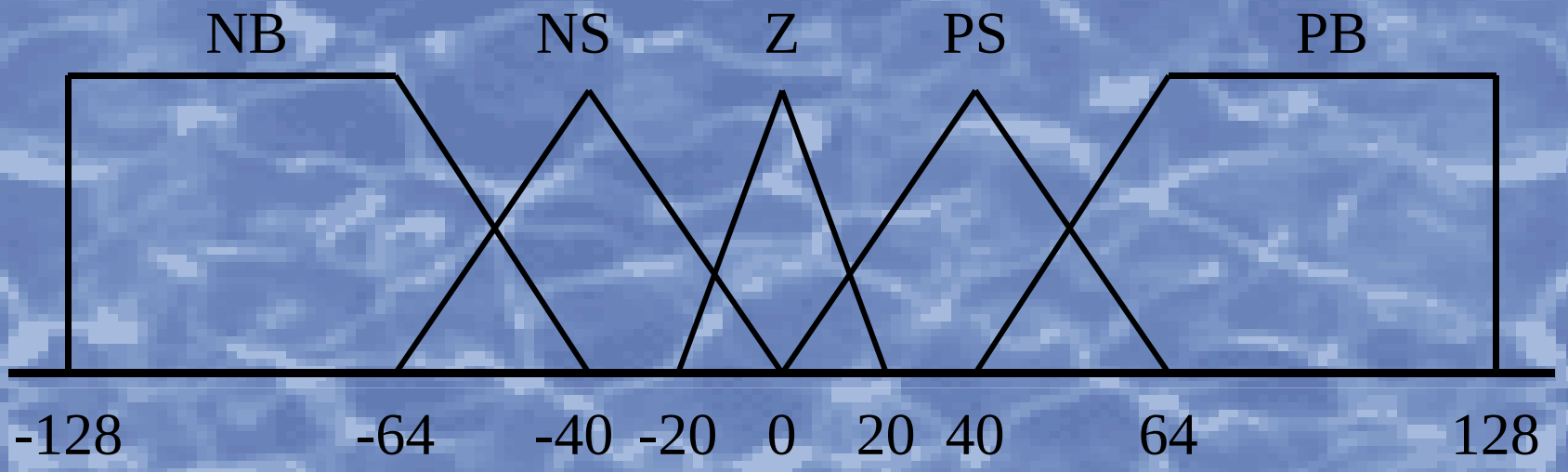
Identification

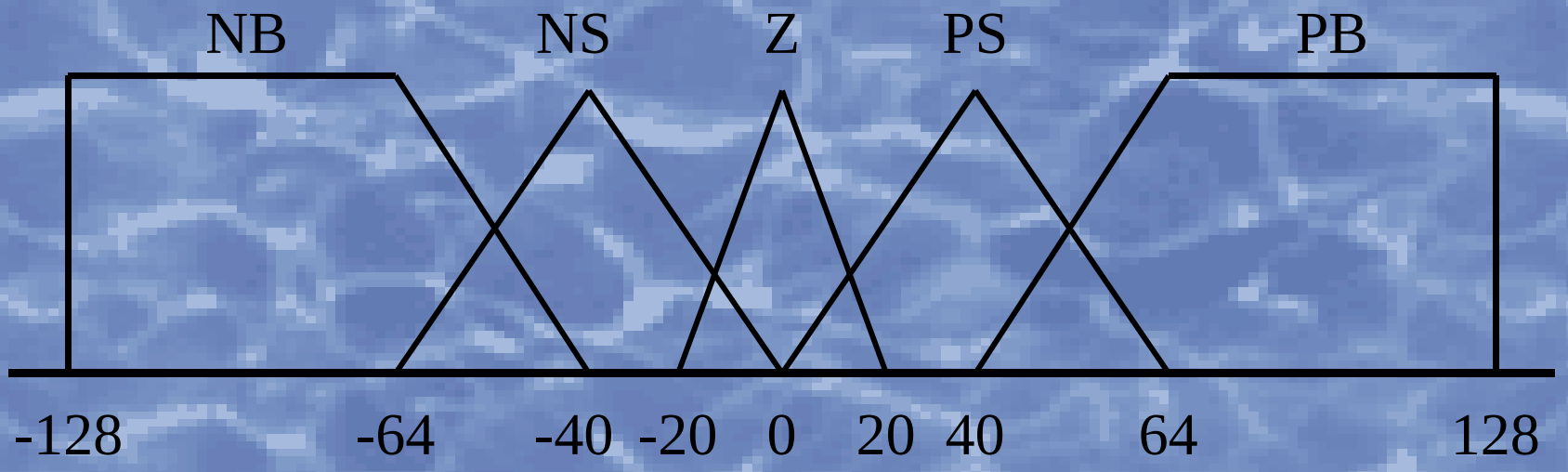
- It uses two inputs (error and d.error)
- It uses one output (PWM)
- 5 labels for each input membership function
- 5 labels for output membership function (singleton)

error = SP - PV

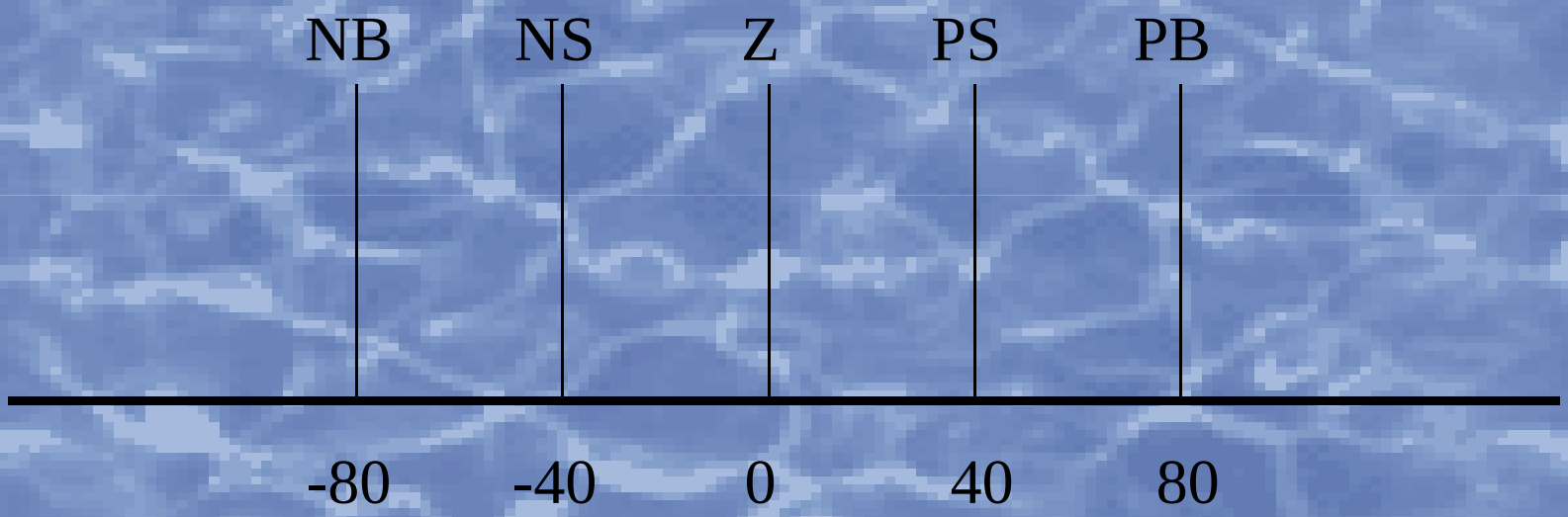
d.error = error(n) – error(n-1)

Input Membership Functions

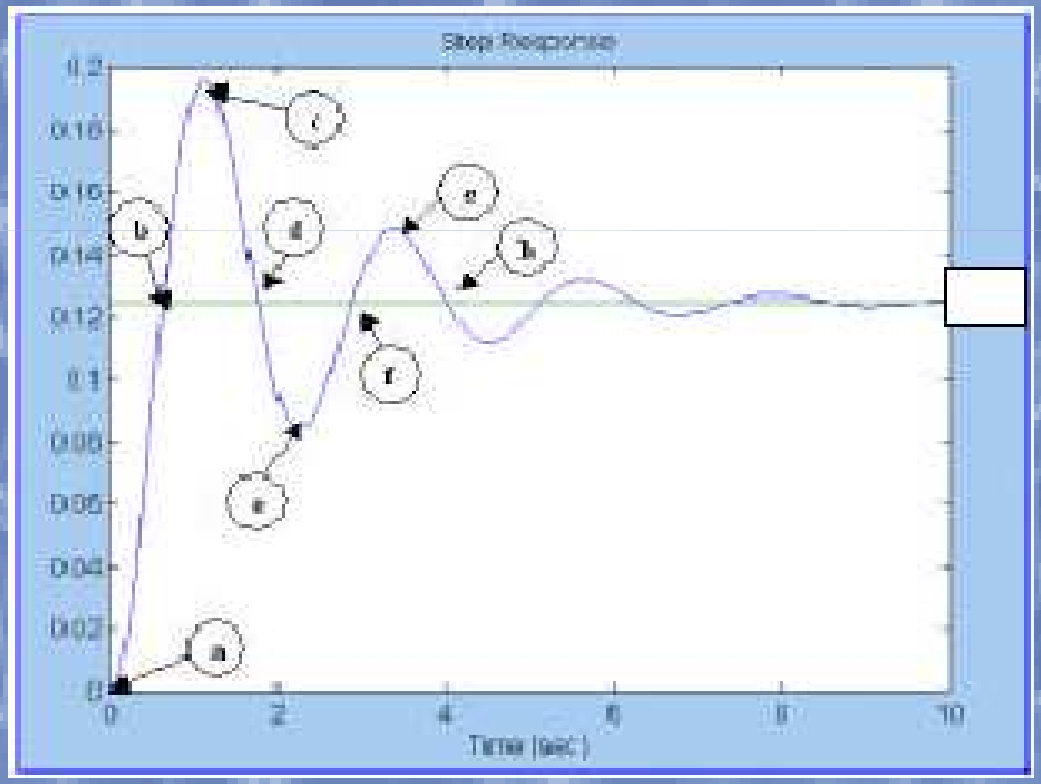




Output Membership Function

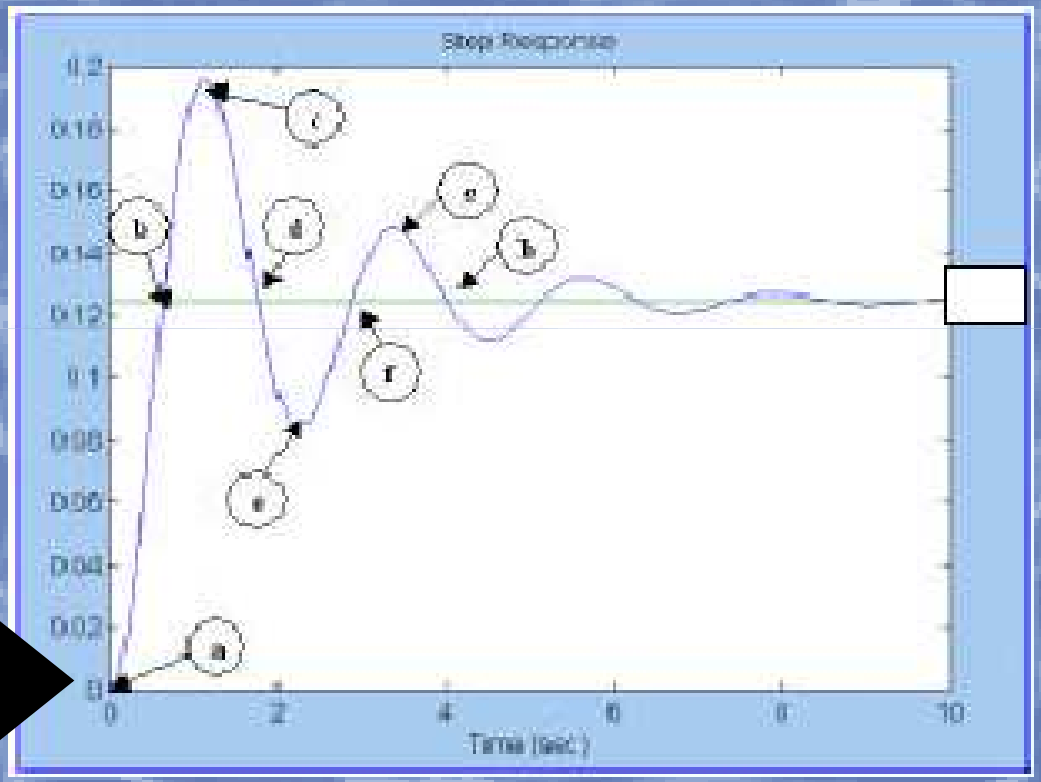


Typical Response
(rule design)



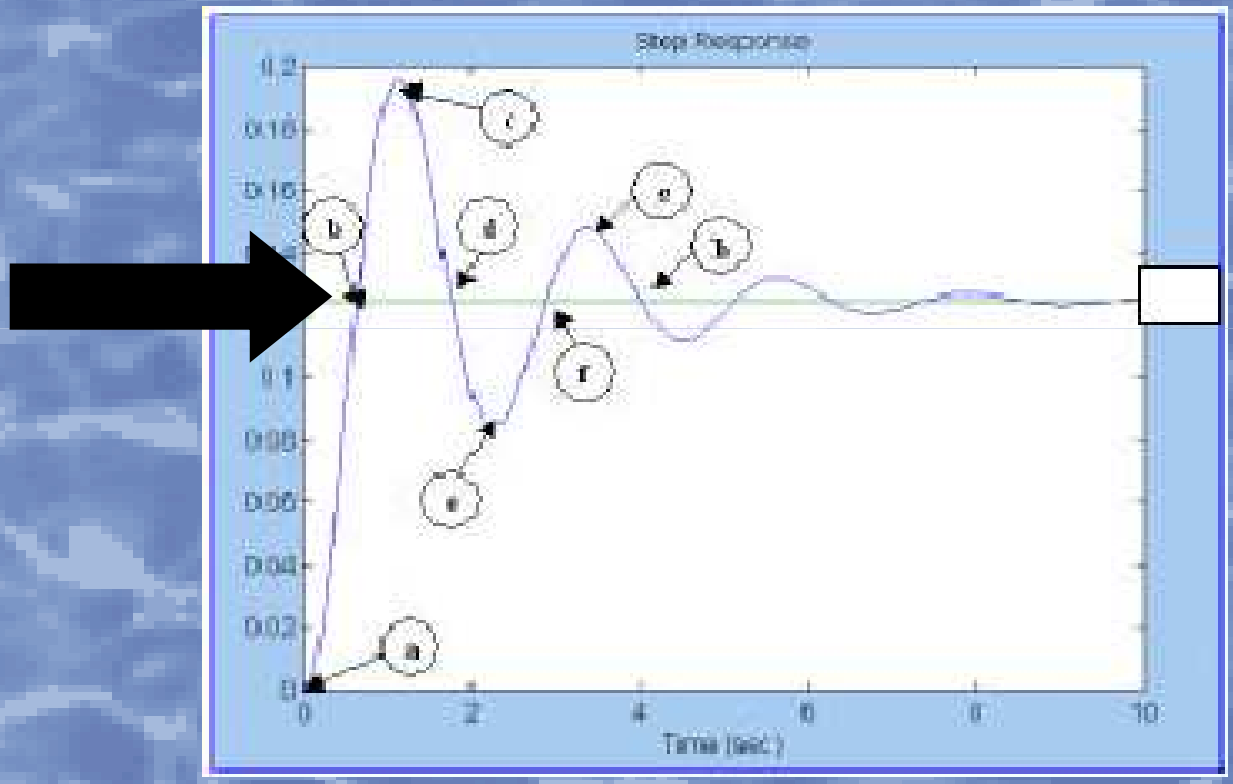
SP

Rule 1



If error is PB and d.error is Z then result is PB

Rule 2



If error is Z and d.error is NB then result is NB

Case 1

Error = 50 and d.error = -10

If error is PB and d.error is Z then result is PB

0.4167 **0.5000** **0.4167**

If error is PS and d.error is Z then result is PS

0.5833 **0.5000** **0.5000**

If error is PS and d.error is NS then result is Z

0.5833 **0.2500** **0.2500**

If error is PB and d.error is NS then result is PS

0.4167 **0.2500** **0.2500**

Case 2

Error = 0 and d.error = 60

If error is Z and d.error is PB then result is PB

0.0000 **0.8333** **0.0000**

If error is Z and d.error is PS then result is PS

0.0000 **0.1667** **0.0000**