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Fuzz Mamdani

x = permintaan → 3500 →

y = persediaan → 250 →

z = produksi → ? →

Max	Min
5000	1000
600	100
7000	2000

Jawab !

1) Fuzzification

Permintaan (x) = 3500

x turun = (5000 - 3500) / (5000 - 1000)

= 1500 / 4000

= 0,375

x naik = (3500 - 1000) / (5000 - 1000)

= 2500 / 4000

= 0,625

Persediaan (y) = 250

y ~~turun~~ sedikit = (600 - 250) / (600 - 100)

= 350 / 500

= 0,7

y ~~naik~~ banyak = (250 - 100) / (600 - 100)

= 150 / 500

= 0,3.

Produksi : ... ?

2) implikasi

(R1) if x turun Δ y banyak (min.), z berkurang

= min ((0,375), (0,3))

= 0,3.

R2. if x turun Δ y sedikit, z berkurang

= min ((0,375), (0,7))

= 0,375

R3. if x naik Δ y banyak, z bertambah

= min ((0,625), (0,3))

= 0,3

R4. if x naik Δ y sedikit, z bertambah.

= min ((0,625), (0,7))

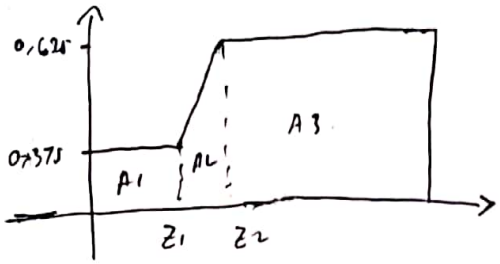
= 0,625

3.) Komposisi aturan Max.

max (berkurang (x), bertambah (x)).

Max berkurang = 0,375.

Max bertambah = 0,625.



z_1,

$$0,375 = \frac{z_1 - 2000}{(7000 - 2000)}$$

$$0,375 = \frac{z_1 - 2000}{5000}$$

$$(0,375 \cdot 5000) + 2000 = z_1$$

$$3.875 = z_1$$

z_2,

$$0.625 = \frac{z_2 - 2000}{5000}$$

$$5125 = z_2$$

Produksi	Derajat keanggotaan
$z \leq 3875$	0,375
$3875 \leq z \leq 5125$	$(z - 2000) / (5000)$
$z \geq 5125$	0,625

4.) Defuzzifikan (Momen)

$$A_1 = \int_0^{3875} (0,375)\, z\, dz$$

$$= 0,187 \cdot z^2 \Big]_0^{3875}$$

$$= 0,187 \cdot (3875)^2 = 2.807.921,88$$

(Luas)

$$A_1 = \int_0^{3875} (0,375)\, dz$$

$$= (0,375 \cdot 3875) - (0,375 \cdot 0)$$

$$= 1453,125$$

$$A_2 = \int_{3875}^{5125} \frac{(z - 2000)}{5000} z\, dz$$

$$= \int_{3875}^{5125} (0,0002 z^2 - 0.4 z)\, dz$$

$$= 0,000067^3 - 0.2 z^2 \Big|_{3875}^{5125}$$

$$= 3.765.833,98$$

$$A_2 = \int_{3875}^{5125} \frac{(z - 2000)}{5000} dz$$

$$= z^2/1000 - 0,4 z \Big|_{3875}^{5000}$$

$$= \left((5000^2/1000) - (0,4 \cdot 5000)\right) - \left((3875^2/1000) - (0,4 \cdot 3875)\right)$$

$$= 1501,56$$

$$A_3 = \int_{5125}^{7000} (0,625)\, z\, dz$$

$$= 0,31 \cdot z^2 \Big|_{5125}^{7000}$$

$$= 7097.656,25$$

$$A_3 = \int_{5125}^{7000} (0,625)\, dz$$

$$= 0,6 \cdot z \Big|_{5125}^{7000}$$

$$= 1125$$

$$\bar{z} = \frac{2.807.921.88 + 3.765.833,98 + 7.047.656,25}{1453,125 + 1501.56 + 1125}$$

$$= \frac{13.621.412,1}{4079,685} = 3338,8 \simeq 3.339 \text{ bobot.}$$

Fuzz Sugeno

x = permintaan -> 1777 ->
y = persediaan -> 235 ->
z = produksi -> ? ->

	Max	Min
	2000	500
	300	100
	9000	500

Jawab

1. Fuzzification

permintaan = 1777

turun = (2000 - 1777)/(2000 - 500)
= 0.148

naik = (1777 - 500)/(2000 - 500)
= 0,851

persediaan = 235

sikit = (300 - 235)/(300 - 100)
= 0,325

banyak = (235 - 100)/(300 - 100)
= 0,675

2. Implikasi

R_1. if x turun ∧ y banyak, maka $z_1 = x - y$

- min (x turun, y banyak) = 0,148.
- z_1 = 1777 - 235
= 1592.

R_2 if x turun ∧ y sedikit, maka $z_2 = x$

- min (x turun, y sedikit) = 0,148
- z_2 = 1777

R_3. if x naik & y banyak, $z_3 = x$

- min (x naik, y banyak) = 0,675
- $z_3 = 1777$

R_4. if x naik & y sedikit, $z_4 = (1,25 \cdot x) - y$

- min (x naik, y sedikit) = 0,325
- $z_4 = (1,25 \cdot 1777) - 235$

$= 1986,25.$

3. Defuzzification

$$z = \frac{a_1 \cdot z_1 + a_2 \cdot z_2 + a_3 \cdot z_3 + a_4 \cdot z_4}{a_1 + a_2 + a_3 + a_4.}$$

$$= \frac{2.336,2}{1,296} = 1802,6 \simeq 1803 \text{ power bank}$$