مدلسازی و بهسازی

دکتر پدرام پیوندی

بخش اول
تئوری منطق فازی

A Computer-Assisted Colour Selection System Based on Aesthetic Measure for Colour Harmony and Fuzzy Logic Theory

Shih-Wen Hsiao,* Fu-Yuan Chiu, Hsin-Yi Hsu

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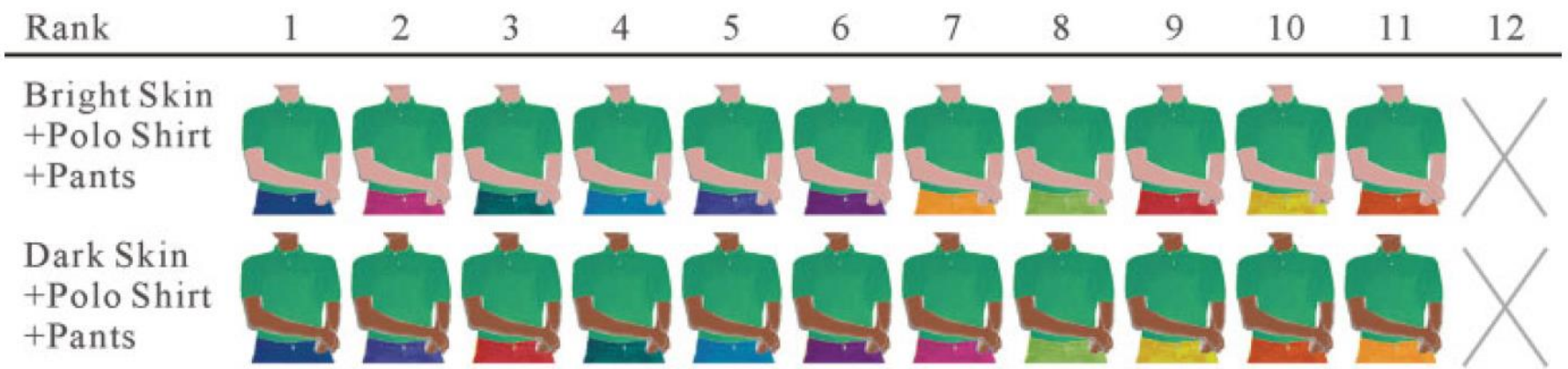

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Appearance Measurement System Using Fuzzy Logic

Haizhuang Kang, Clive Butler, Qingping Yang, Franco Sacerdotti, Fabrizio Benati

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Analysis of Vibrotactile Perception via e-Textile Structure Using Fuzzy Logic

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Abstract

The aim of this study is to evaluate vibrotactile perception via an e-textile structure on different parts of the body by different signal types and frequencies. First an e-textile structure was developed by the integration of a vibration motor to knitted fabric using conductive yarns. Then various signal waveforms at different frequencies were applied to diverse parts of the user's body via this novel textile structure. Signals were generated by using a DAQ (Data Acquisition) card. Finally vibrotactile perceptions were evaluated and compared by groups of people using fuzzy linguistic scales. It was found that the signal waveform and frequency had a significant effect on the vibrotactile perception. Furthermore the perception level of vibrotactile stimulation showed differences depending on the part of the human body. This e-textile based vibrotactile information could be highly valuable for applications like directional navigation, where the visual sense is restricted, for driving, for piloting and for medical applications like body relaxation against stress.

Key words: *vibrotactile perception, e-textiles, fuzzy logic, vibration motors, signal waveform, frequency, body parts.*

Clothing recommendation based on fuzzy mathematics

Authors: Lu, Hong[1]; Chen, Yan[2]; Dai, Hong-qin[2]

Source: International Journal of Advanced Operations Management, Volume 5, Number 1, January 2013 , pp. 14-30(17)

Publisher: Inderscience Publishers

Abstract:

In this paper, a clothing recommendation method is developed based on fuzzy mathematics, which is the theoretical foundation of the clothing interactive system. The design elements and sensory knowledge are elicited by using the method of interviewing, laddering and card sorting. The different linguistic variables are represented by triangle fuzzy numbers. Fuzzy total utility value and fuzzy utility similarity are used to show the reflection between the design elements space and sensory image space. The method of analytic hierarchy process (AHP) is applied to quantify the important ratio of nine design element items. On the basis of the fuzzy synthesis evaluation theory, all samples can be sorted into different sets respectively and then the garments in the proper set are recommended to customers according to their single or multiple needs. Although, men's suit is taken as a case study in this paper, the techniques and methods can be extended to other garments.

Keywords: MANAGEMENT AND BUSINESS; Operational Management and Marketing

Document Type: Research Article

DOI: http://dx.doi.org/10.1504/IJAOM.2013.051323

Fuzzy Logic of Matching Sense on Fashion Image

Fashion products contain lots of sensory information, such as style, color, matching of clothing and accessories, etc. Sensory Engineering is applied as an approach for garment industry to improve service of CRM (customer resource management), to provide personalized design frame work, to establish fashion E-retail and decision support system. It can be used for quality inspection, product design and marketing of fashion products. Although accounts of researches have acquired quite achievement on mathematical formalization of sensory data, the models for of clothing and accessories are still not established. In this research, several methods were designed to establish the models for matching sensory of fashion image data based on fuzzy logic theory. The sensory data used in this research were collected according to consumer preferences and the fuzzy logical rules were generated from expert knowledge.

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Natural Computation, 2008. ICNC '08. Fourth International Conference on (Volume:7)

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INSPEC Accession Number:
10393170

Indian Journal of Fibre & Textile Research
Vol. 34, September 2009, pp. 258-266

An intelligent system for supporting design of fashion oriented personalized fabric products

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Department of Textile Technology, Indian Institute of Technology, Hauz Khas, New Delhi 110 016, India

Received 1 September 2008; revised received and accepted 21 November 2008

An intelligent system for supporting the design of fashion oriented personalized fabric samples has been proposed. Based on fuzzy logic and semantic network, it permits to model the relationship between fabric parameters and fashion design elements via fashion images. This system can effectively help textile producers and designers to determine parameters of new fabrics to be produced according to fashion requirements of garments and predict garment fashion styles for given fabrics. A sensory evaluation on fabric hand has been used to determine fabric parameters of a collection of samples. Principal component analysis has been used to reduce the complexity of the model. A set of fashion images has been selected in order to extract abstract fashion design elements and identify relationship between fabric samples and fashion design elements. This system is helpful for textile companies to realize mass customization, i.e. design and production of personalized products with very low costs.

Keywords: Fabric parameters, Fashion design elements, Fashion images, Fuzzy logic, Mass customization

Indian Journal of Fibre & Textile Research
Vol. 36, March 2011, pp. 74-80

Estimation of fabric color by camera based neuro- fuzzy technique

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Received 3 January 2010; revised received and accepted 9 June 2010

A new method for measuring the textile fabric color by digital camera has been developed in order to establish a relationship between the digital camera RGB response and the device-independent CIE color space by using neuro-fuzzy technique. The results show that the performance of digital camera based neuro-fuzzy technique depends on the number and type of membership function. The best prediction is obtained in CIELAB color space by using two Gaussian combination membership functions with 2.75 ΔE*ab.

Keywords: Digital camera, Fabric, Membership function, Neuro-fuzzy technique

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Volume 6, Issue 3, Spring2010

Scheduling Optimization in a Cloth Manufacturing Factory Using Genetic Algorithm with Fuzzy Logic for Multi-Objective Decision

Bessem Kordoghli,[1,3] Seifeddine Saadallah,[3] Mohamed Jmali[1,2] and Noureddine Liouene[2]

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EVALUATION OF APPAREL PLANTS ACCORDING TO ERGONOMIC CONTIDIONS USING FUZZY LOGIC

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ABSTRACT

In this study, physical conditions of eight different apparel mills such as temperature, humidity, illumination and noise were evaluated. In order to evaluate these aforementioned conditions, measurements were taken in 4 different seasons in all departments of the apparel mills. A hundred units scale was prepared for the evaluation based on the determined limit values for the apparel industry. These limit values were determined as a result of the literature search related with the performed measurements. This prepared scale was used for the evaluation of 4 different physical factors for the departments according to the fuzzy logic method. The values obtained for each apparel mill via using fuzzy logic method were re-evaluated considering the employee capacity. Thus, comparison of 8 different apparel mills was done based on the final result.
Keywords: Physical working conditions, ergonomics, fuzzy logic, apparel industry.

Proceedings of the 10th Asian Textile Conference ~ATC-10 ~ September 7-9, 2009 Ueda, Japan

Knowledge-based Interactive Design for Men's Suit

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Abstract: The design elements of Men's suit are discussed and analysed in this paper. The design elements of men's suit are divided into nine parts: silhouette, style line of collar, fall, break point, rever position, facing corner, bust pocket, waist pocket and decoration. These elements have direct influences on the sensory evaluation results. A knowledge-based interactive design system for men's suit is advanced on the basis of these researches. The knowledge in this model includes the explicit and implicit parts respectively. The explicit part is related to men's suit itself, which is acquired from designers by laddering, and interviewing methods etc. The implicit part is related to the sensory created from the men's suit, which is obtained by means of card sorting and investigation to designers, customers and some other professional persons. According to the different sensory demands of consumer, some appropriate suits are recommended for choice. The recommend procedure is accomplished by using fuzzy synthesis evaluation.

Key words: knowledge acquisition, knowledge based, design, fuzzy systems

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The current issue and full text archive of this journal is available at
www.emeraldinsight.com/0955-6222.htm

Learning-based fuzzy colour prediction system for more effective apparel design

Chi-Leung Hui, Tak-Wah Lau and Sau-Fun Ng
Institute of Textiles and Clothing, The Hong Kong Polytechnic University, HungHom, Hong Kong, People's Republic of China, and
Chun-Chung Chan
Department of Computing, The Hong Kong Polytechnic University, HungHom, Hong Kong, People's Republic of China

The current issue and full text archive of this journal is available at
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A new method of ease allowance generation for personalization of garment design

Yu Chen, Xianyi Zeng, Michel Happiette and Pascal Bruniaux
Ecole Nationale Supérieure des Arts & Industries Textiles, Roubaix, France, and
Royer Ng and Winnie Yu
Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Kowloon, Hong Kong, People' Republic of China

Abstract

Purpose – The purpose of this paper is to present recent work for optimizing the estimation of ease allowance of a garment using fuzzy logic and sensory evaluation.

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br
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A Fuzzy Algorithm for understanding the customer's desire. An application designed for textile industry.

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Accept: 05/05/2013

Characterization of Fashion Themes Using Fuzzy Techniques for Designing New Human Centered Products

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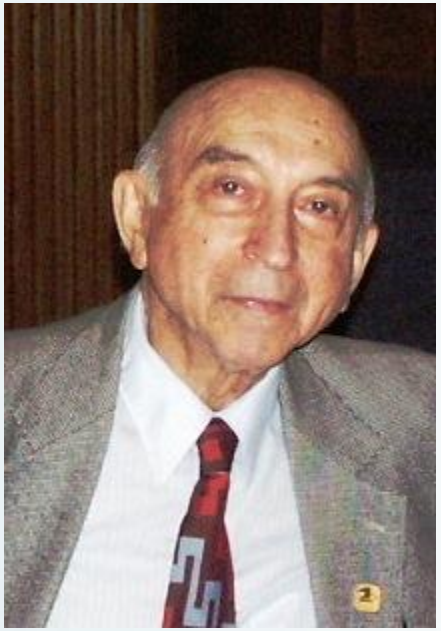


زندگی و تحصیل [ویرایش]

وی در ۱۵ بهمن ۱۲۹۹ خورشیدی (۴ فوریه ۱۹۲۱ میلادی) در باکو در آذربایجان شوروی زاده شد.[۶] پدرش «رحیم‌علی عسکرزاده» روزنامه‌نگار و بازرگان، از اهالی اردبیل و خبرنگار روزنامه «ایران» و مادرش «فانیا کوریمان» پزشک کودکان یهودی روس بود.[۷][۸] لطفی تحصیلات دبستان خود را در همین شهر و به زبان روسی آغاز کرد. در زمانی که ده ساله بود، پدر و مادر لطفی، در پی قحطی و نایابی ناشی از سیاست‌های تعاونی‌سازی دوران ژوزف استالین، باکو را ترک و به ایران و شهر تهران مهاجرت کردند.[۶]

وی در تهران در مدرسه مبلغان آمریکایی شروع به تحصیل کرد و زبان انگلیسی و زبان فارسی آموخت و سپس در دبیرستان البرز (به نام پیشین: *مدرسه مسیونری پرسبیتری*) و در دانشکده فنی دانشگاه تهران ادامه تحصیل داد و در طول جنگ جهانی دوم در تهران با ارتش آمریکا همکاری داشت.[۵]

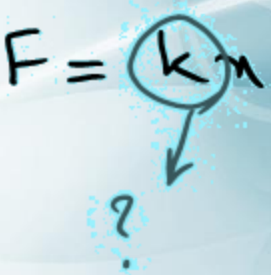
لطفی زاده در امتحانات ورودی دانشگاه تهران مقام دوم را کسب کرد. در سال ۱۹۴۲ رشته مهندسی برق را در این دانشگاه با موفقیت به پایان رساند و در دوران جنگ جهانی دوم و اشغال ایران توسط متفقین به ایالات متحده مهاجرت کرد. در مؤسسه فناوری ماساچوست (امآی‌تی) ادامه تحصیل داد و در سال ۱۹۴۶ درجه کارشناسی ارشد خود در مهندسی برق را دریافت نمود. به‌دلیل زندگی والدینش در نیویورک، از دانشگاه کلمبیا تقاضای پذیرش کرد و در مقطع دکترا با یک منصب تدریس پذیرفته شد. در سال ۱۹۴۹ فارغ‌التحصیل و سال بعد استادیار همان دانشگاه شد.

لطفی زاده روز ۲۰ مارس ۱۹۴۶ و در ایام نوروز با «فی سند»، دختر یک خانواده لتونیایی ازدواج کرد. خانواده «فی» سال‌ها قبل به تهران مهاجرت کرده و او در آنجا با لطفی آشنا شده بودند. او و لطفی زاده یک دختر به نام استلا و یک پسر به نام نورم زاده (Norm Zada) داشتند. پس از ده سال تدریس در دانشگاه کلمبیا، در سال ۱۹۵۷ به درجه استاد تمامی ارتقا یافت. او از سال ۱۹۵۹ تا پایان عمر در دانشگاه کالیفرنیا، برکلی تدریس می‌کرد. از سال ۱۹۶۳، ابتدا در رشته الکتروتکنیک و پس از آن در رشته علوم رایانه درجه استادی گرفت. لطفی زاده پس از بازنشستگی در سال ۱۹۹۱ مقیم سان فرانسیسکو شد

Fuzzy

فازی

توانایی بیان عدم قطعیت



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منطق فازی

مزایای عمده استفاده از سیستم های فازی

۱- بیان و توصیف عدم قطعیت

۲- ابزاری جدیدی برای حل مشکلاتی که تئوری احتمالات راهی برای آن ها ندارد

۳- استفاده از دانش انسانی

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۱) ماشینِ لباسشویی - ژاپن ۱۹۹۰

۲) مترو سنندج ژاپن ۱۹۹۱

۳) حذف لرزش دست در دوربین فیلم برداری

٤) صنایع الکترونیک سازی

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$A = \{1, 2, 3, 4, 5\}$

$(1 \in A) \equiv$ True

$(2 \notin A) \equiv$ False

$(6 \in A) \equiv$ False

$$I_A(x) = \begin{cases} 1 & x \in A \\ 0 & x \notin A \end{cases}$$

روزهای زوج = { شنبه ، دوشنبه ، چهارشنبه }

روزهای فرد = { یک شنبه ، سه شنبه ، پنج شنبه }

جمعه

$V = \{a, e, i, o, u\}$

$y \in V$?

$y \in V$

$y \notin V$

{ Fuzzy
Cybernetics

{ Gray
Day
Year

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روزهای زوج $= \left\{ \frac{\text{سه‌شنبه}}{1} , \frac{\text{دوشنبه}}{1} , \frac{\text{چهارشنبه}}{1} , \frac{\text{جمعه}}{0.5} \right\}$

اعداد طبیعی نزدیک به ① $= \left\{ \frac{1}{1} , \frac{2}{0.5} , \frac{3}{0.25} , \frac{4}{0.1} \right\}$

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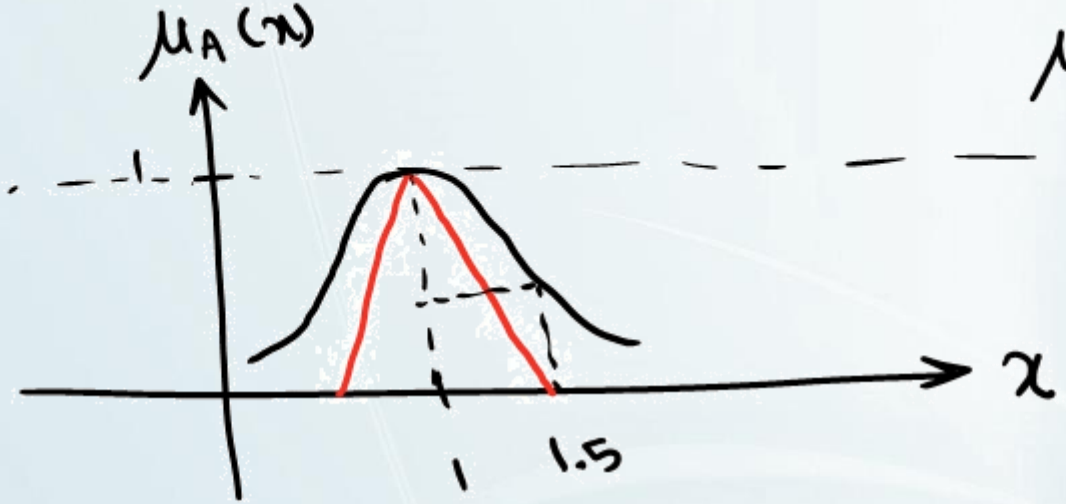

$\mu_A : X \longrightarrow [0,1]$

$0 \leq \mu_A(x) \leq 1$

A : اعداد نزدیک به یک

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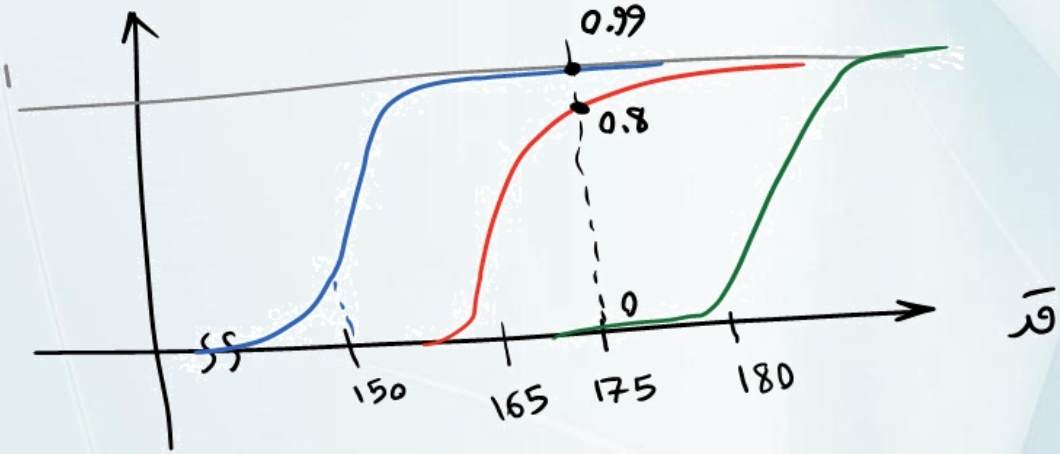


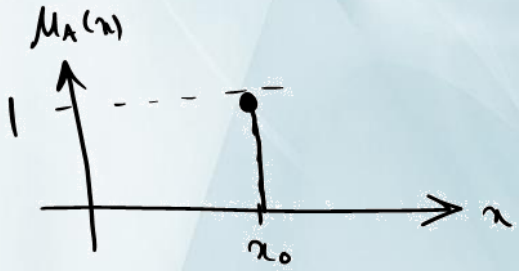
$A \longrightarrow \mu_A(.)$ $\qquad \mu_A : U \longrightarrow [0,1]$

مجموعه $\qquad$ تابع عضویت

$(x \in A) \equiv \mu_A(x)$

Sigleton :

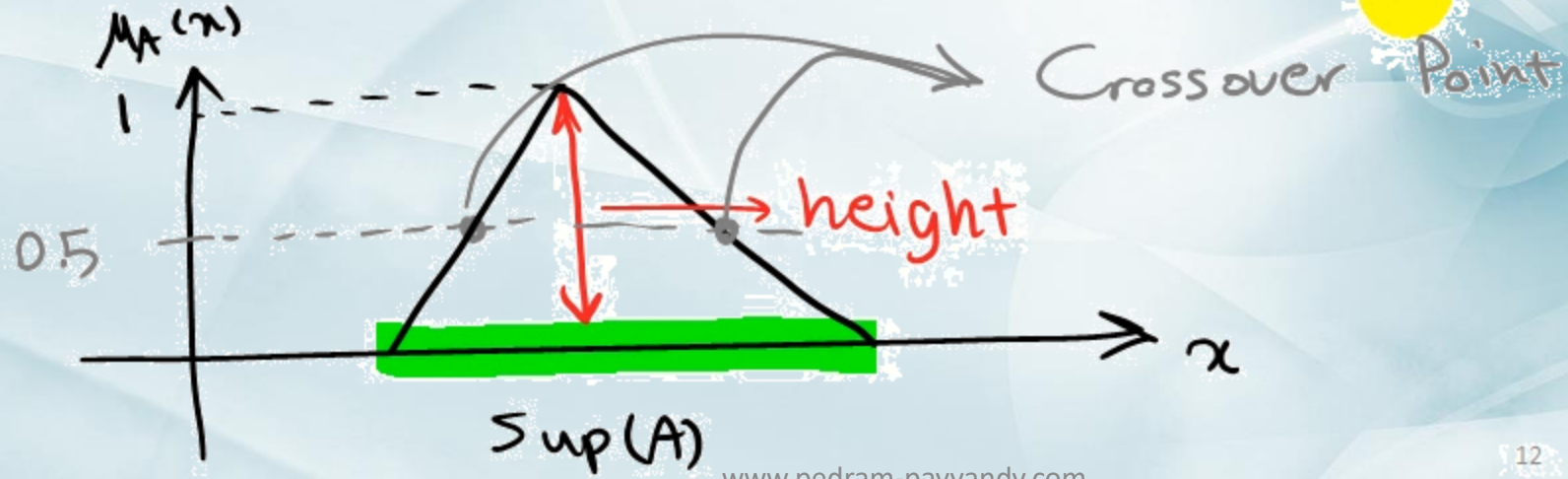
$Sup(A) = \{x_0\}$

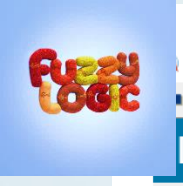


$A \rightarrow \mu_A : U \rightarrow [0,1]$

$0 \leq \mu_A(x) \leq 1$

$Sup(A) = \{x \mid \mu_A(x) > 0\}$





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Fuzzy Logic Toolbox

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- DSP System Toolbox
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- Embedded Coder
- Filter Design HDL Coder
- Fixed-Point Designer
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  - Fuzzy Inference System Modeling
  - Fuzzy Inference System Tuning
  - Data Clustering
  - Fuzzy Logic in Simulink

Fuzzy Logic Toolbox

Design and simulate fuzzy logic systems

Fuzzy Logic Toolbox™ provides MATLAB® functions, apps, and a Simulink® block for analyzing, designing, and simulating systems based on fuzzy logic. The product guides you through the steps of designing fuzzy inference systems. Functions are provided for many common methods, including fuzzy clustering and adaptive neurofuzzy learning.

The toolbox lets you model complex system behaviors using simple logic rules, and then implement these rules in a fuzzy inference syste You can use it as a stand-alone fuzzy inference engine. Alternatively, you can use fuzzy inference blocks in Simulink and simulate the fuzz systems within a comprehensive model of the entire dynamic system.

Getting Started

Learn the basics of Fuzzy Logic Toolbox

Fuzzy Inference System Modeling

Help

Getting Started with Fuzzy Logic Toolbox

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- **Getting Started with Fuzzy Logic Toolbox**
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- Fuzzy Logic in Simulink
- Deployment

The toolbox lets you model complex system behaviors using simple logic rules, and then implement these rules in a fuzzy you can use fuzzy inference blocks in Simulink and simulate the fuzzy systems within a comprehensive model of the entir

Tutorials

Fuzzy vs. Nonfuzzy Logic
To illustrate the value of fuzzy logic, examine both linear and fuzzy approaches to a basic tipping problem.

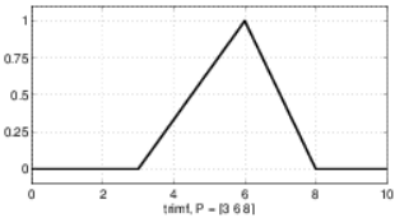
Build Fuzzy Systems Using Fuzzy Logic Designer
Interactively construct a fuzzy inference system using the Fuzzy Logic Designer app.

Build Fuzzy Systems at the Command Line
Construct a fuzzy inference system at the MATLAB command line.

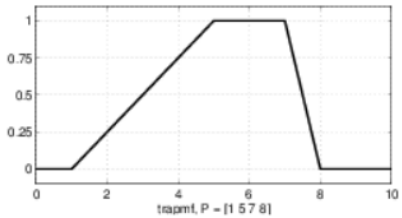
About Fuzzy Logic

What Is Fuzzy Logic?
Fuzzy logic uses linguistic variables, defined as fuzzy sets, to approximate human reasoning.

Foundations of Fuzzy Logic
A fuzzy logic system is a collection of fuzzy if-then rules that perform logical operations on fuzzy sets.



trimf



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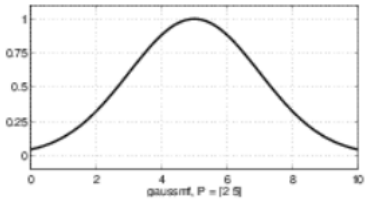
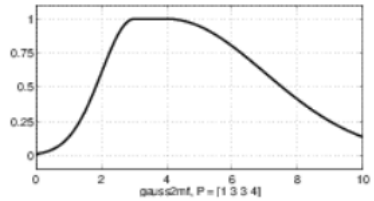
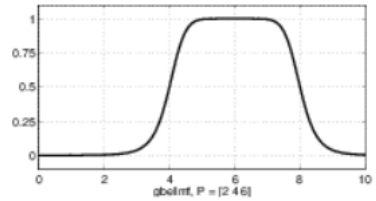


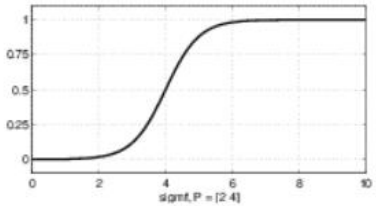
gaussmf



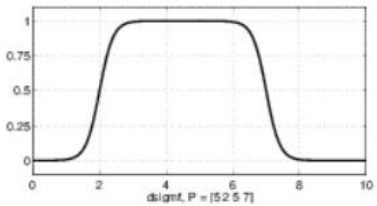
gauss2mf



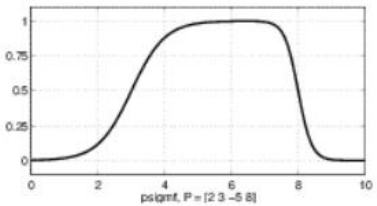
gbellmf



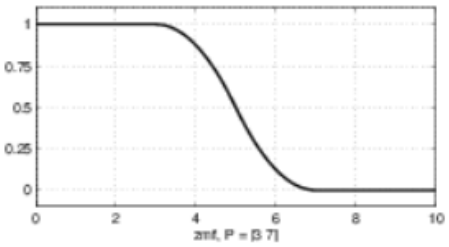
sigmf



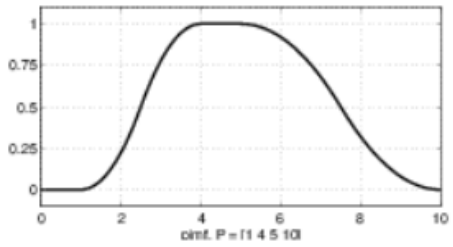
dsigmf



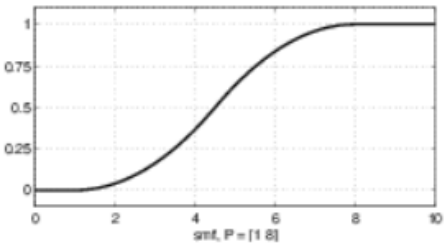
psigmf



zmf



pimf



smf

```
y = trimf(x,params)
```

```
x = 0:0.1:10;
y = trimf(x,[3 6 8]);
plot(x,y)
xlabel('trimf, P = [3 6 8]')
ylim([-0.05 1.05])
```

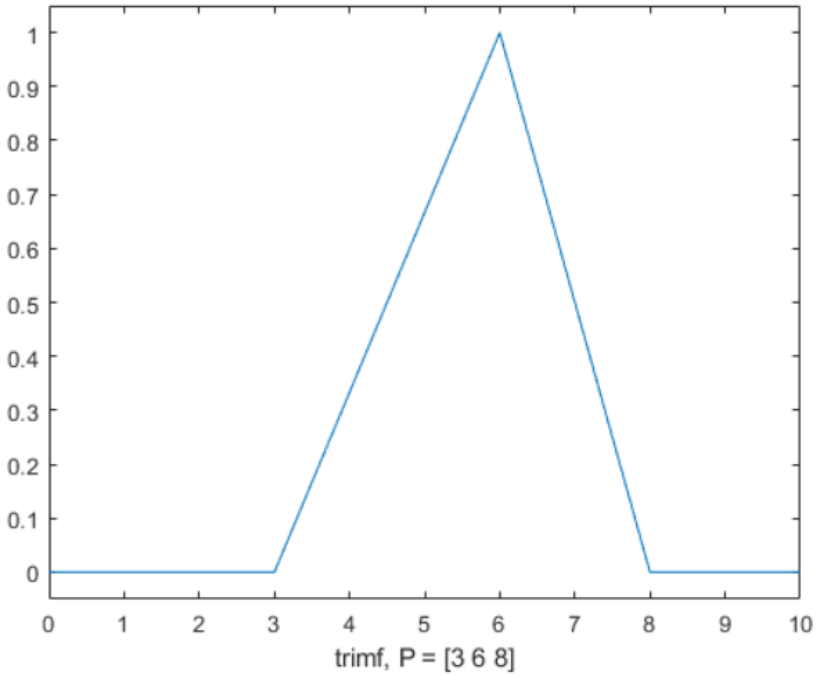
$$f(x;a,b,c) = \begin{cases} 0, & x \le a \\ \frac{x-a}{b-a}, & a \le x \le b \\ \frac{c-x}{c-b}, & b \le x \le c \\ 0, & c \le x \end{cases}$$

or, more compactly:

$$f(x;a,b,c) = \max\left(\min\left(\frac{x-a}{b-a}, \frac{c-x}{c-b}\right), o\right)$$

To specify the parameters, a, b, and c, use `params`.

Membership values are computed for each input value in `x`.



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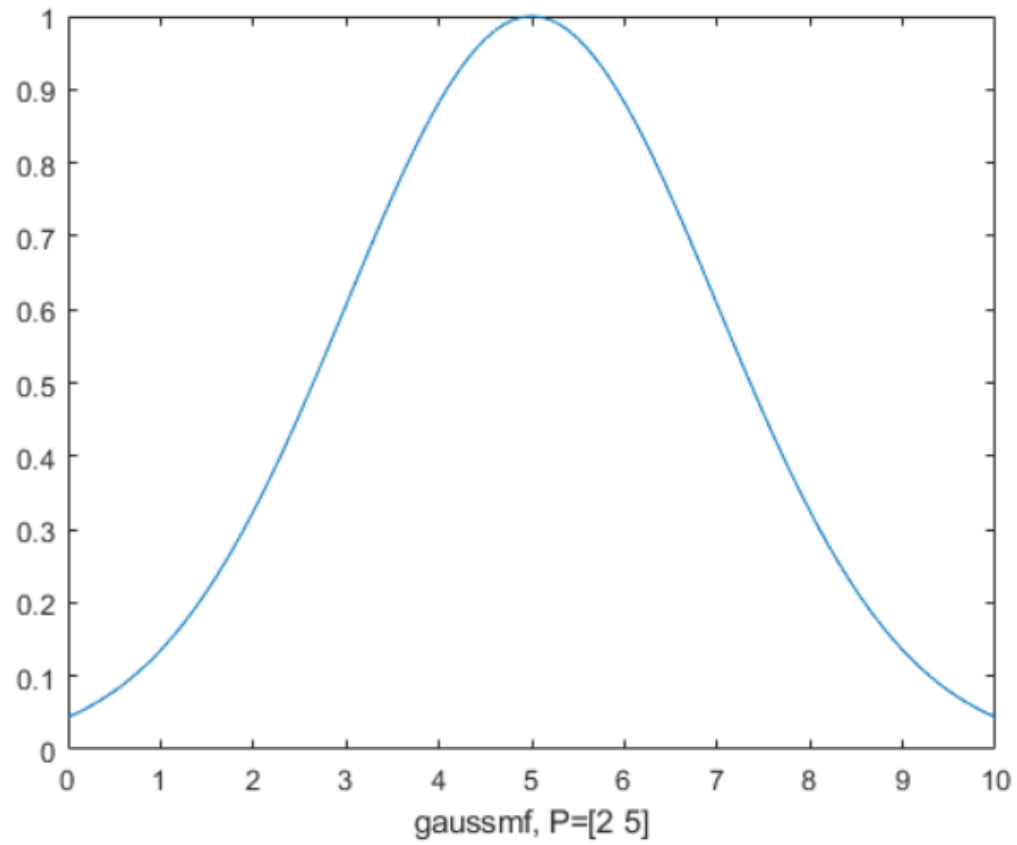
```
x = 0:0.1:10;
y = gaussmf(x,[2 5]);
plot(x,y)
xlabel('gaussmf, P=[2 5]')
```




```
y = gaussmf(x,params)
```

$$f(x;\sigma,c) = e^{\frac{-(x-c)^2}{2\sigma^2}}$$

Complement مکمل/متمم

$$\bar{A} = \{x \mid x \notin A\}$$

$$A = \{x \mid x \in A\}$$

Not نقیض

$$\sim (x \in A) \equiv x \notin A$$

$$\sim P = 1 - P$$

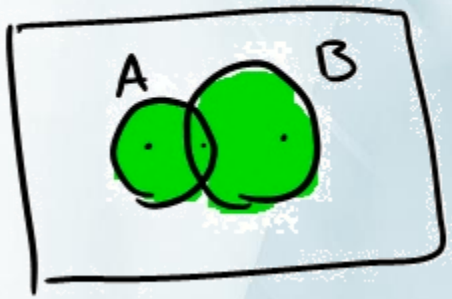
A : $\mu_A(x)$

$\bar{A}$: $\mu_{\bar{A}}(x) = 1 - \mu_A(x)$

P	~P
0	1
1	0
0.8	0.2

$$A \cup B = \{x \mid x \in A \vee x \in B\}$$

OR



P	q	p v q
0	0	0
0	1	1
1	0	1
1	1	1

$$p \vee q = \max(p, q)$$

$$\mu_{A \cup B}(x) =$$

$$\max(\mu_A(x), \mu_B(x))$$

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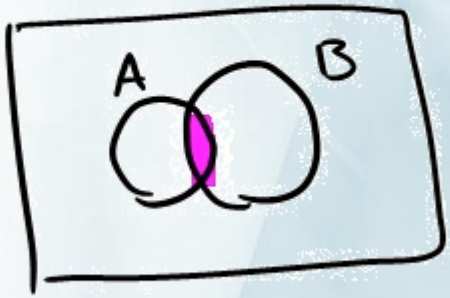
$$A \wedge B = \{x \mid x \in A \wedge x \in B\}$$

AND



P	q	$P \wedge q$
0	0	0
0	1	0
1	0	0
1	1	1

$$p \wedge q = \min(p, q)$$

$$\mu_{A \cap B}(x) = \min(\mu_A(x), \mu_B(x))$$

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مکمل / متمم

$c: [0\ 1] \longrightarrow [0\ 1]$

$c(a) = b$

۱) شرایط مرزی :

$c(0) = 1 \quad , \quad c(1) = 0$

۲) شرط نزولی بودن :

$\forall a, b \in [0, 1] : \quad a < b \Rightarrow c(a) \geq c(b)$

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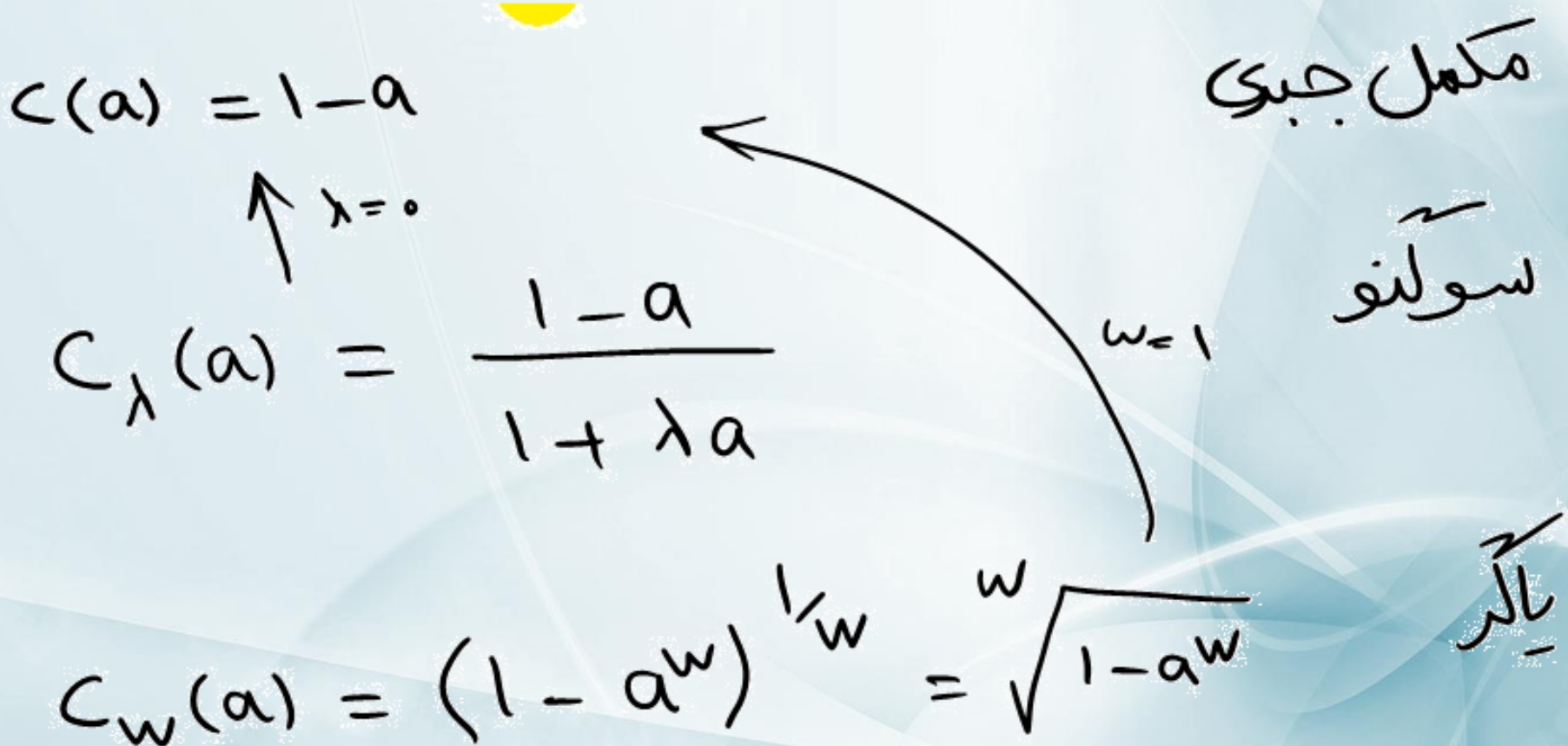

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اجتماع فازی یا s-norm

$$s(a,b) \in [0,1]$$

$$s: [0\ 1] \times [0\ 1] \longrightarrow [0\ 1]$$

۱) شرایط مرزی $s(a,0) = s(0,a) = a$ $\quad s(1,1) = 1$

۲) تعویض پذیری / تقارن $\quad s(a,b) = s(b,a)$

۳) شرکت پذیری $\quad s(s(a,b),c) = s(a,s(b,c))$

۴) صعودی بودن

$$\left.\begin{array}{l} a \leqslant a' \\ b \leqslant b' \end{array}\right\} \Rightarrow s(a,b) \leqslant s(a',b')$$

$$S(a,b) = a+b-ab$$

اجتماع جبری

(جمع جبری)

یا گر Yager

$$S_w(a,b) = \min\left(1, \underbrace{(a^w + b^w)^{1/w}}_{\max}\right)$$

جمع دراستیک

$$S_{ds}(a,b) = \begin{cases} a & b=0 \\ b & a=0 \\ 1 & \text{otherwise} \end{cases}$$

$$\max(a,b) \leq S(a,b) \leq S_{ds}(a,b)$$ قضیه

اشتراک فازی $t: [0\ 1] \times [0\ 1] \rightarrow [0\ 1]$ t-norm

شرایط

۱) شرایط مرزی $t(0,0) = 0 \quad , \quad t(1,a) = t(a,1) = a$

۲) جابجایی پذیری / تعارن $t(a,b) = t(b,a)$

۳) شرکت پذیری $t(t(a,b),c) = t(a,t(b,c))$

۴) شرط صعودی بودن $\left.\begin{matrix} a \leqslant a' \\ b \leqslant b' \end{matrix}\right\} \rightarrow t(a,b) \leqslant t(a',b')$

$$t(a,b) = ab$$

جبری

ضرب دراستیک

$$t_{dp}(a,b) = \begin{cases} a & b=1 \\ b & a=1 \\ 0 & \text{otherwise} \end{cases}$$

$$t_{dp}(a,b) \leqslant t(a,b) \leqslant \min(a,b)$$

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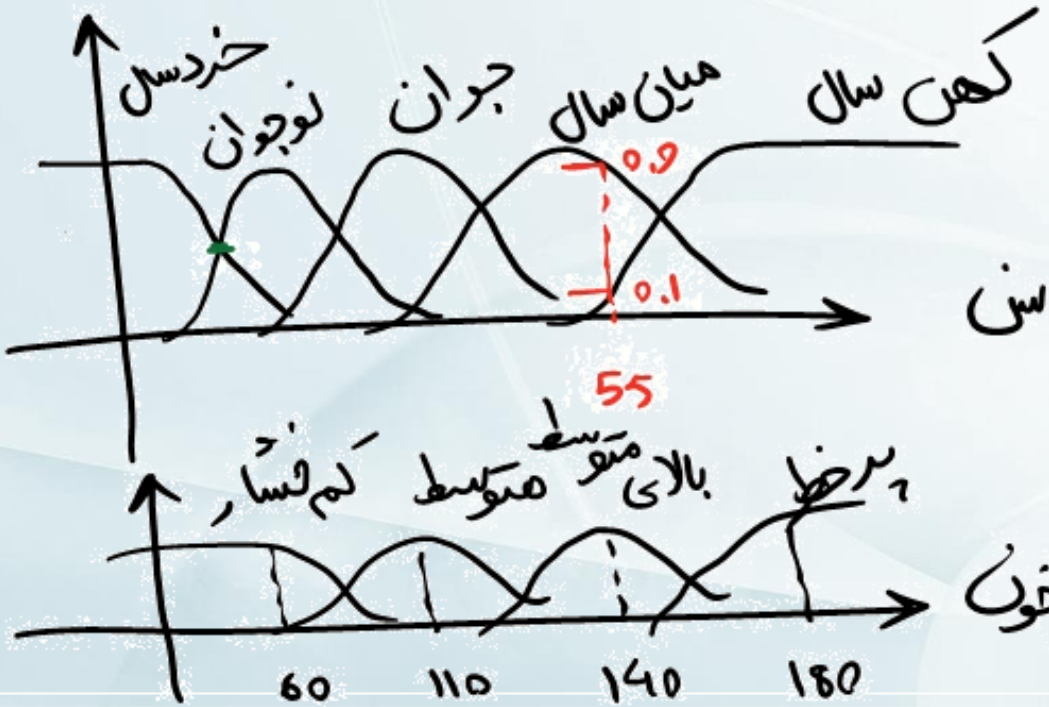
اگر سن بالا باشد و فشارخون بالا باشد، مصرف نمک حداقل شود.



منطق فازی

متغیرهای زبانی:

سن

قد

دما

زمان

اندازه

روشنایی

قیمت

وزن

فاصله

سرعت

ظاهر

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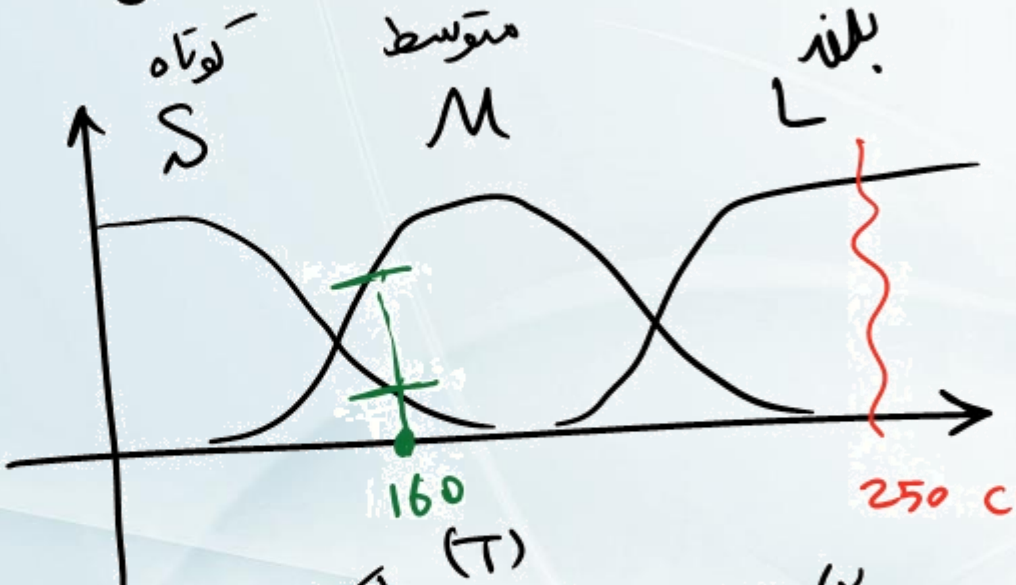
Linguistic Variables متغیرهای زبانی



(X, T, U, M)

۱) نام متغیر (قد) ; x ۲) مجموعه عبارات {کوتاه، متوسط، بلند}

۳) دامنه تغییرات (U) $[0,250]$ ۴) مجموعه‌های فازی (M)

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$$x \text{ is } A \equiv \mu_A(x)$$

گزاره

$$x \text{ is not } A \equiv C[\mu_A(x)]$$

$$1 - \mu_A(x)$$

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x is A **and** / **or** y is B

$\mu_A(x)$ $\mu_B(y)$

t-norm

s-norm

$\min$ / $\max$ $(\mu_A(x), \mu_B(y))$

$\mu_A(x) \cdot \mu_B(y)$

$\mu_A(x) + \mu_B(y) - \mu_A(x)\,\mu_B(y)$

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Rule : قاعده

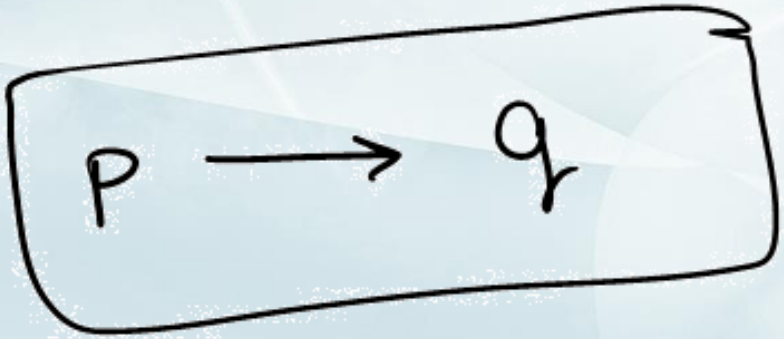
If <گزاره> Then <گزاره>

مقدم

P

تالی

q



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If $\langle FP_1 \rangle$ Then $\langle FP_2 \rangle$

If x is A and y is B Then z is C

$p = \mu_A(x) \cdot \mu_B(y)$

$q = \mu_C(z)$

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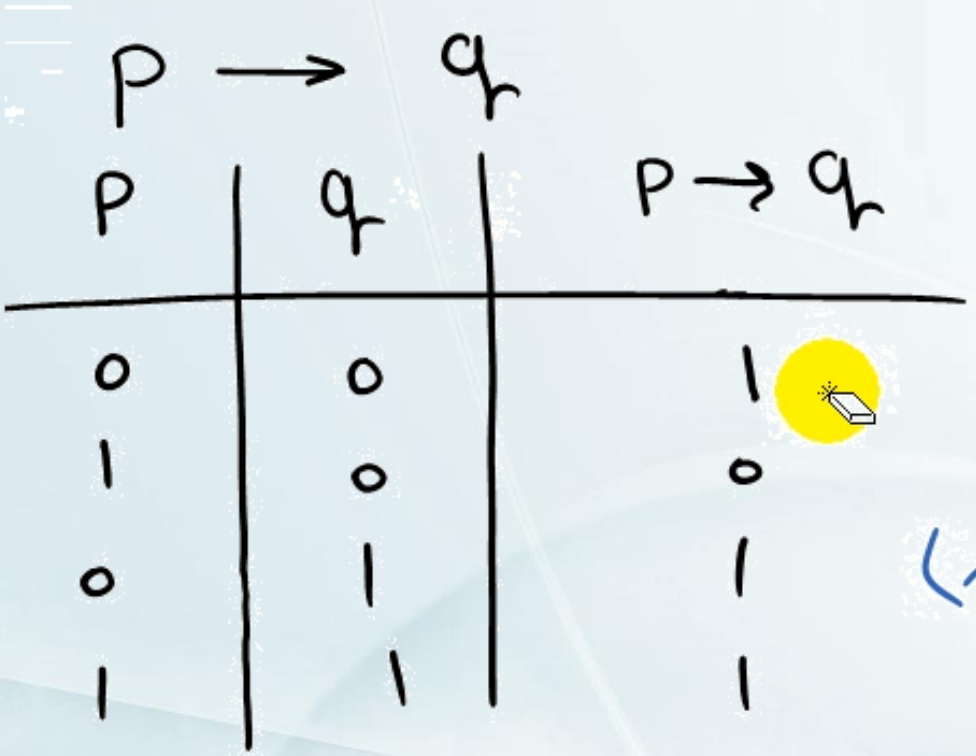

$\sim p \vee p = 1$

$r \wedge 1 = r$

⟿ برهان خلف

$(\sim p \vee q) \wedge (\sim p \vee p)$

$\sim p \vee (q \wedge p)$

$p \to q \equiv \sim p \vee q \equiv (p \wedge q) \vee \sim p$

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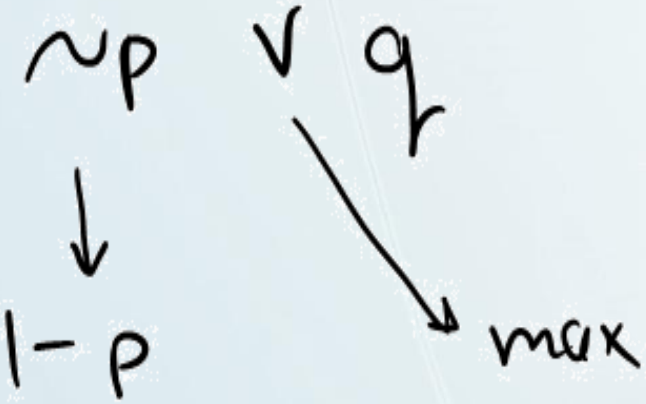

Dienes - Rescher

$$\mu_{QD}(p, q) = \max(1 - p, q)$$

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Lukasiewics Implication

$$\mu_{RL}(p,q) = \min(1, 1-p+q)$$

Zadeh Implication

$$\mu_{RZ}(p,q) = \max\{\min(p,q), 1-p\}$$

Gödel

$$\mu_{RG}(p,q) = \begin{cases} 1 & p \leq q \\ q & \text{otherwise} \end{cases}$$

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Mamdani Implication

$$\mu_{QMM}(p,q) = \min(p,q)$$

$$\mu_{QMP}(p,q) = pq$$

$$\mu_{QZ} \leq \mu_{QD} \leq \mu_{QL}$$

$$QZ \subseteq QD \subseteq QL$$

$$QMP \subseteq QMM \subseteq QG$$

$$QG \subseteq QL$$

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IF $\langle FP_1 \rangle$ THEN $\langle FP_2 \rangle$ Rule (R)

$$p = \mu_{FP_1}(x) \qquad q_r = \mu_{FP_2}(y)$$

$$\mu_{RZ}(x,y) = \max\left\{\min\left\{\mu_{FP_1}(x), \mu_{FP_2}(y)\right\}, 1-\mu_{FP_1}(x)\right\}$$

$$\mu_{RMP}(x,y) = \mu_{FP_1}(x)\,\mu_{FP_2}(y)$$

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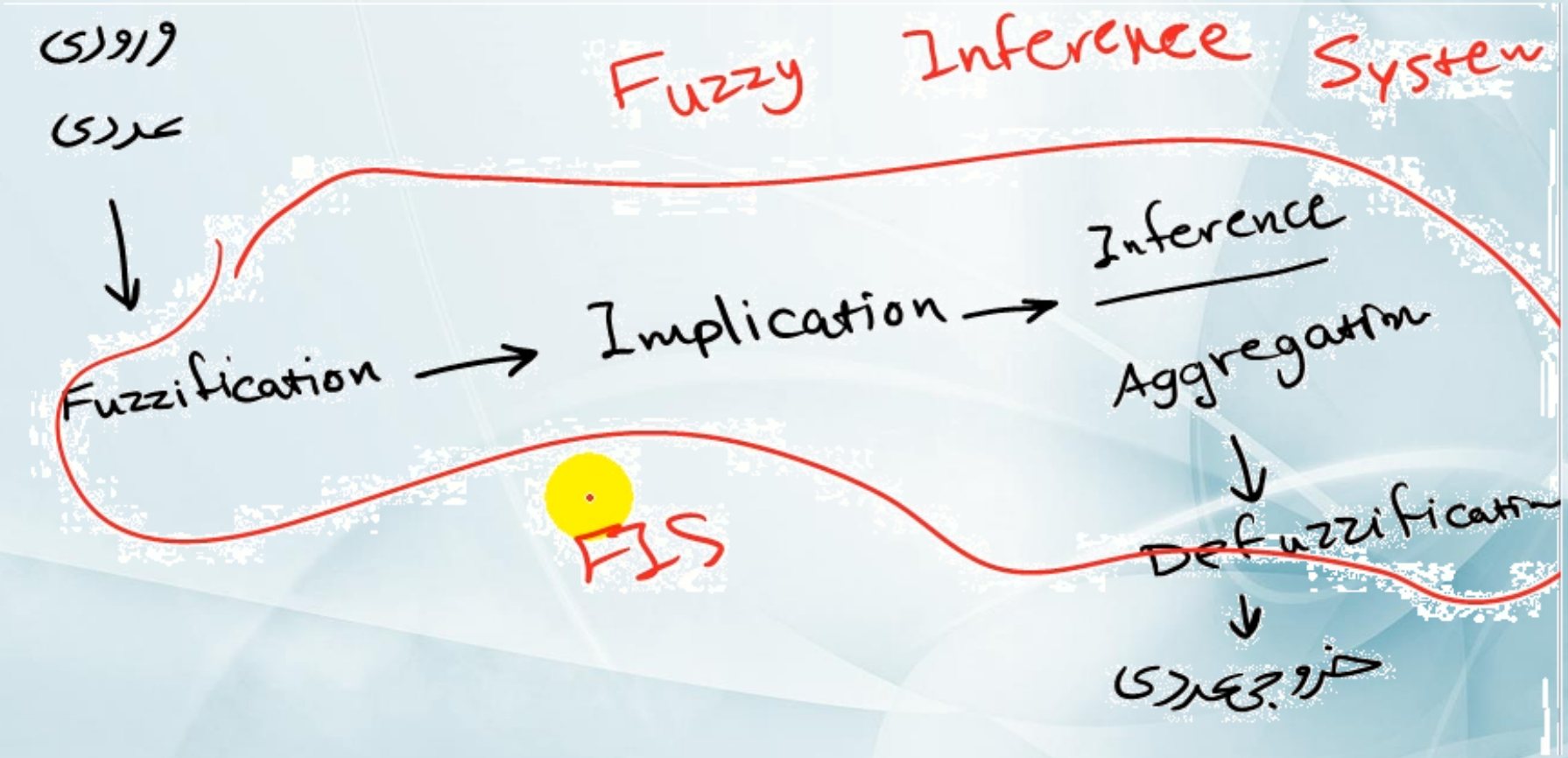
سن = {جوان ، میانسال ، پیر}

فشارخون = {کم ، متوسط ، زیاد}

نمک = {خیلی کم ، کم ، متوسط ، زیاد ، خیلی زیاد}

سن \ فشارخون	کم	متوسط	زیاد
جوان	زیاد	متوسط 0.3	کم 0.7
میانسال	متوسط	متوسط	خیلی کم
پیر	متوسط	کم	خیلی کم



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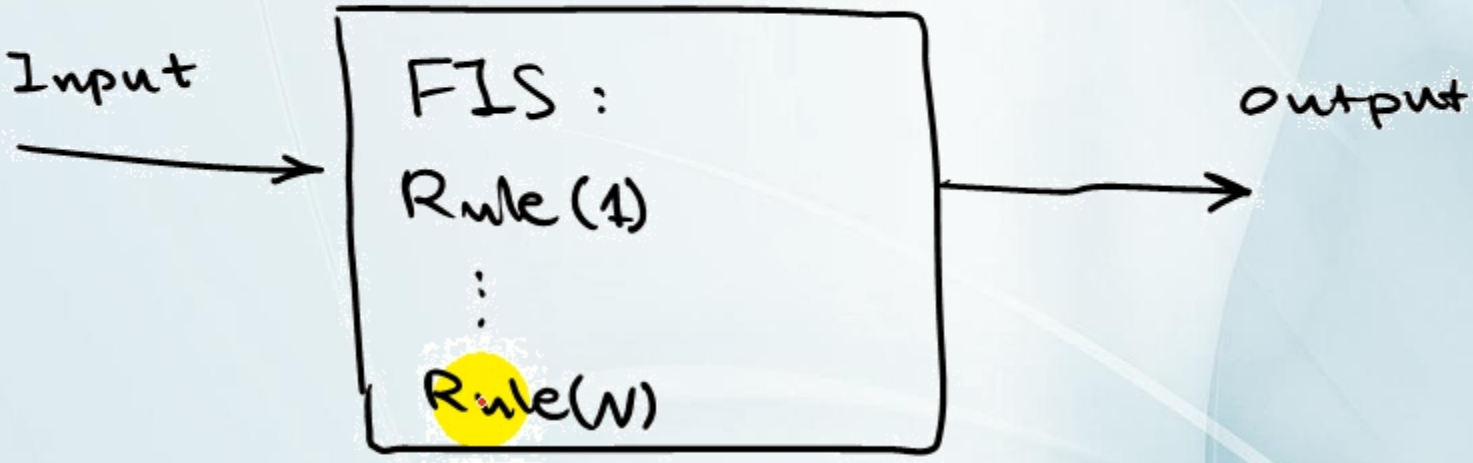

FIS : INPUT ⟶ OUTPUT

شرایط بیماران ⟶ نسخه‌ها

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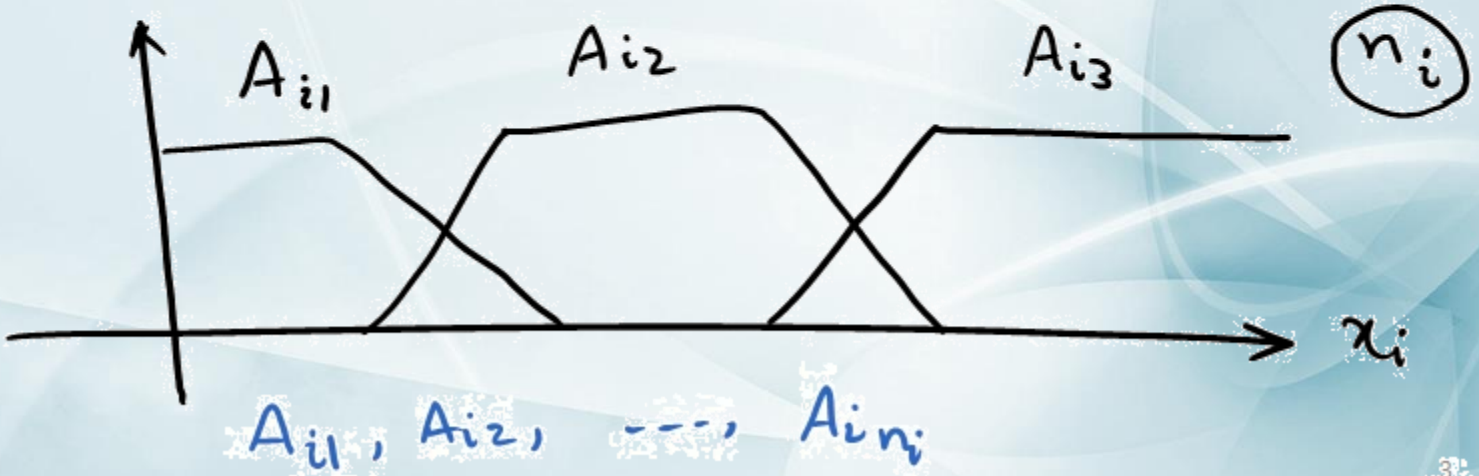
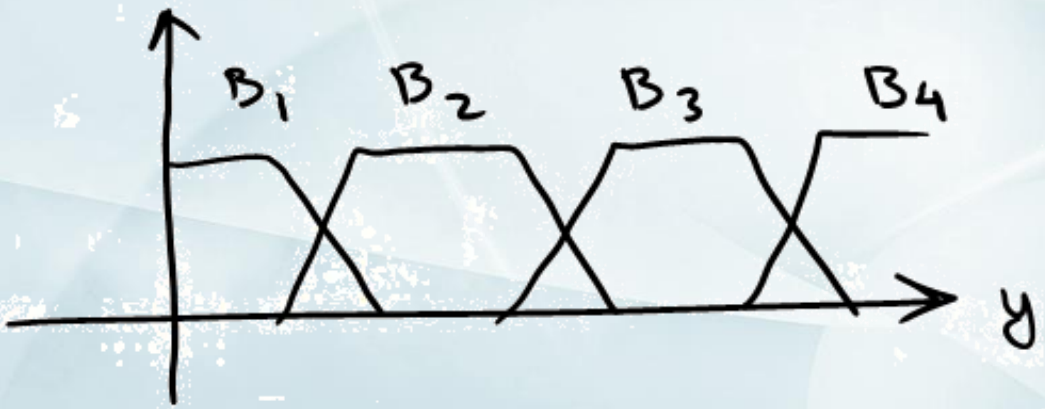
Input :

$x_1, x_2, \ldots, x_i, \ldots, x_N$



Output:

$y \rightarrow \underbrace{B_1, B_2, \ldots, B_{ny}}_{ny}$



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Rule (k) :

IF (x_1 is A_{1l_1} and x_2 is A_{2l_2} and ... — and x_N is A_{Nl_N}) مقدم

$\mu_{A_{1l_1}}(x_1)$ $\mu_{A_{2l_2}}(x_2)$ $\mu_{A_{Nl_N}}(x_N)$

THEN (y is B_{l_y}) تالی

مجموعه فازی

$\mu_{B_{l_y}}(y)$

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Rule (k):

IF FP_{1k} Then y is B_{ly} $\mu_{B_{ly}}(y)$

$$\alpha_k = \min\left\{\mu_{A_{1l_1}}(x_1), \dots, \mu_{A_{Nl_N}}(x_N)\right\}$$

$$\alpha_k = \mu_{A_{1l_1}}(x_1) \times \cdots \times \mu_{A_{Nl_N}}(x_N)$$

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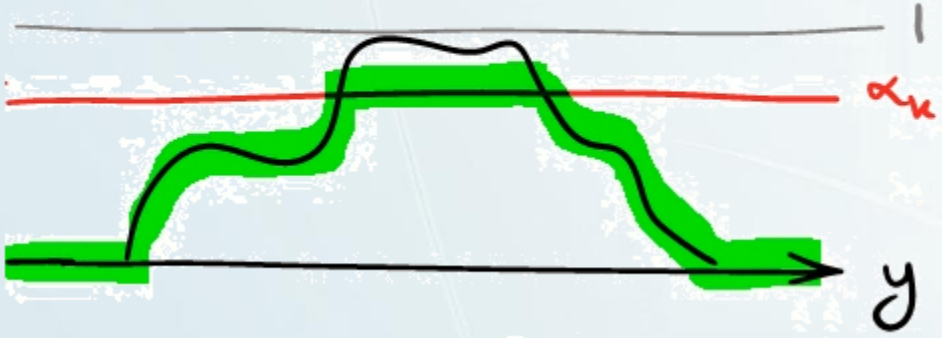
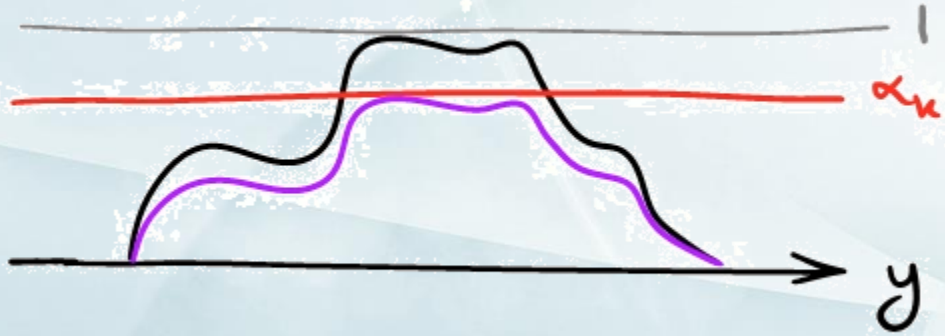


MM

مینیمم ممدانی



MP

ضرب ممدانی

α_k $\mu_{B_{ly}}(y)$

MM: $\min(\alpha_k, \mu_{B_{ly}}(y))$

MP: $\alpha_k \mu_{B_{ly}}(y)$

هردو توابع تعلق هستند

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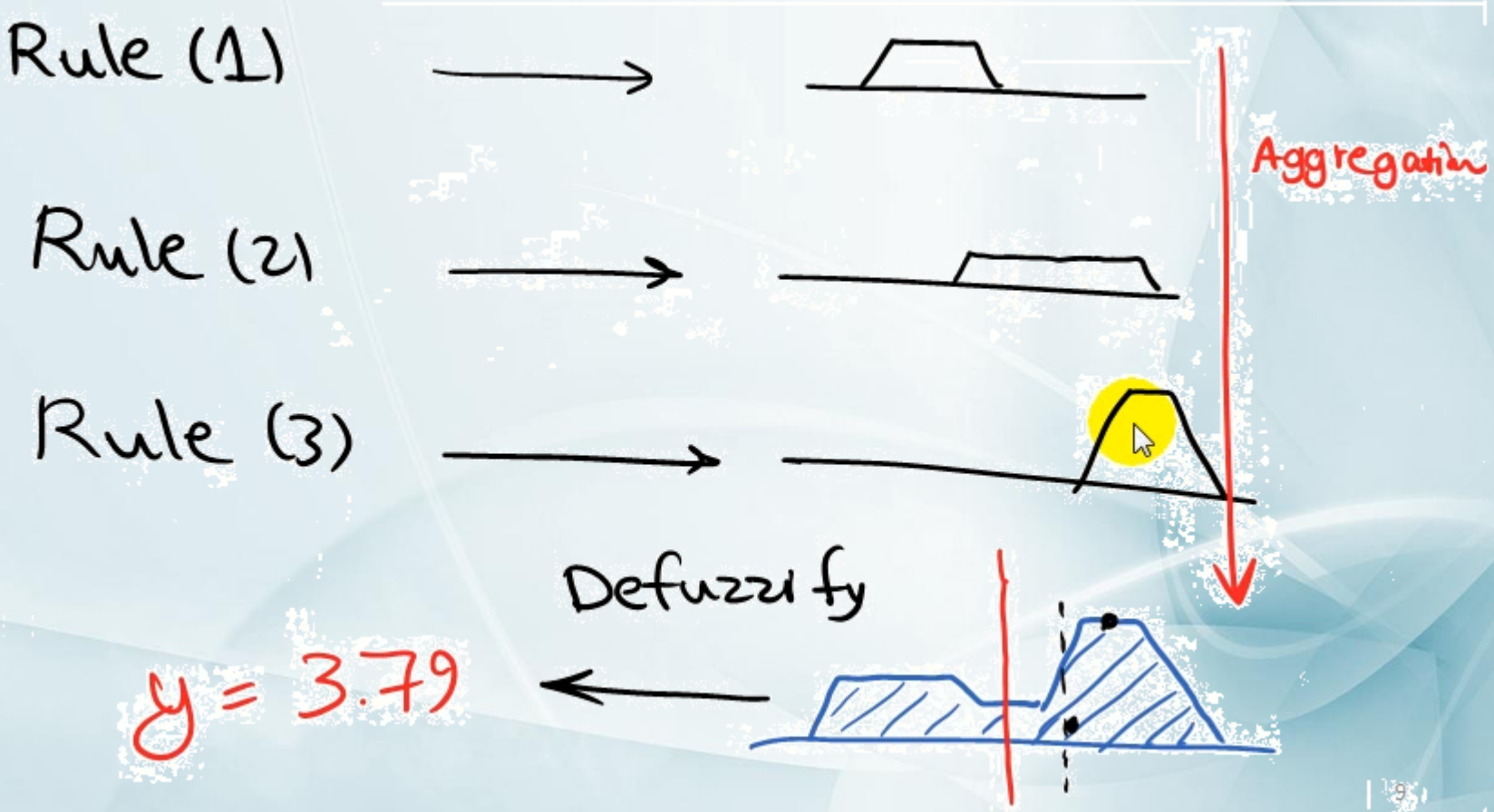

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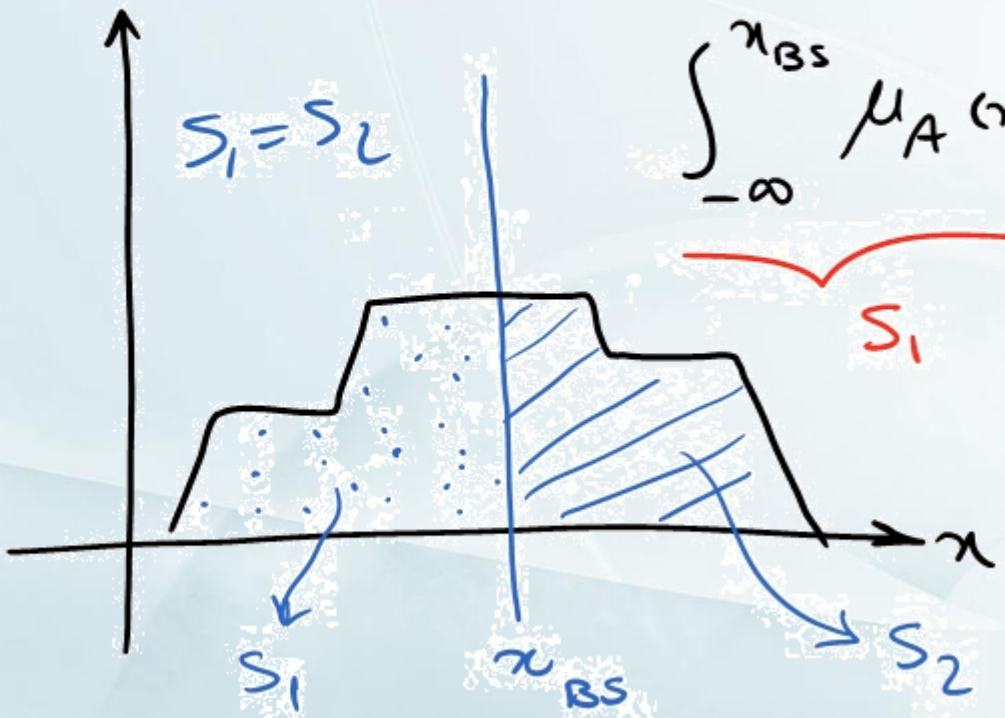
$x \rightarrow \mu_A(x)$

Bisector



$$\int_{-\infty}^{x_{BS}} \mu_A(x)\,dx = \int_{x_{BS}}^{+\infty} \mu_A(x)\,dx$$

S_1 S_2

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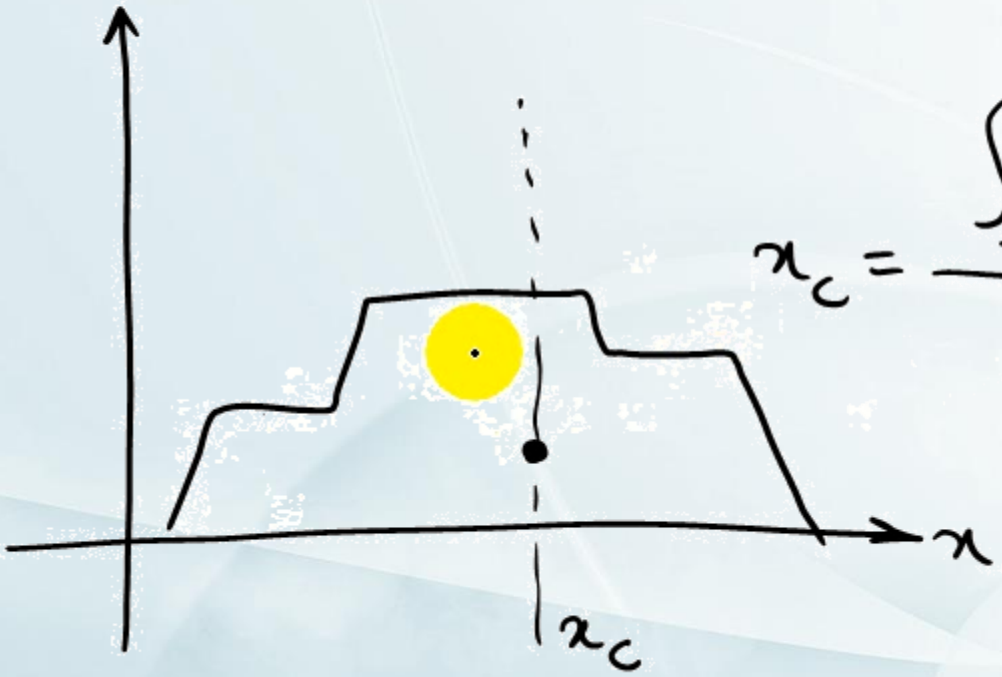
$x \rightarrow \mu_A(x)$

Centroid مرکز ثقل

میانگین وزنی

$$x_c = \frac{\int_{-\infty}^{\infty} \mu_A(x)\, x\, dx}{\int_{-\infty}^{\infty} \mu_A(x)\, dx}$$



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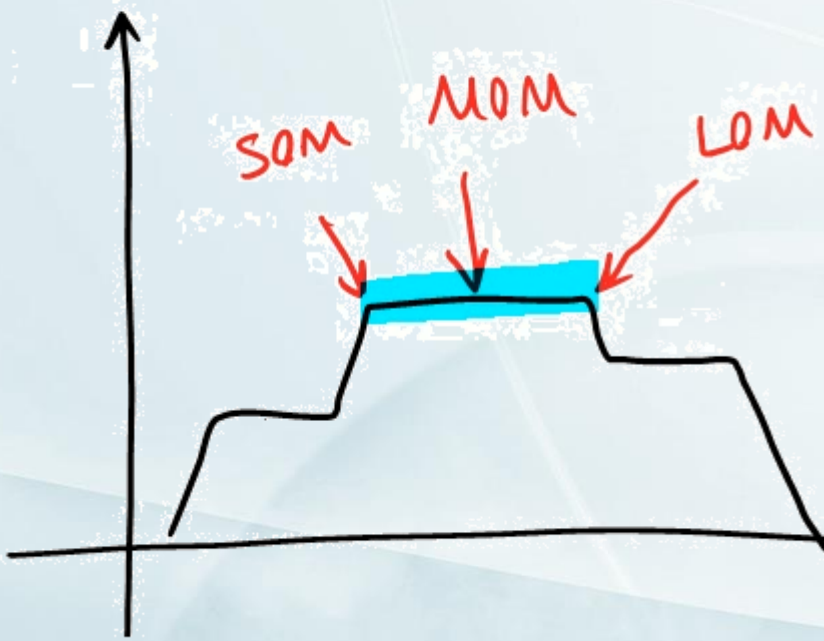
$x \rightarrow \mu_A(x)$



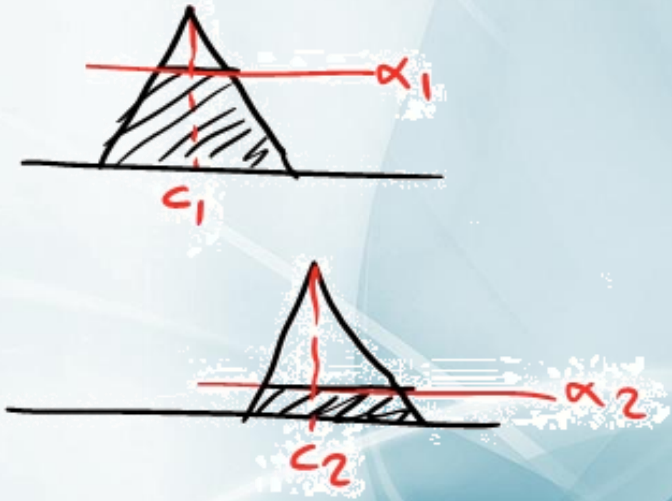
SOM, MOM, LOM

↓

Smallest
Mean
Largest
} of Maxima

MoC : Mean of Centers

$$x_{MoC} = \frac{\alpha_1 c_1 + \alpha_2 c_2}{\alpha_1 + \alpha_2}$$



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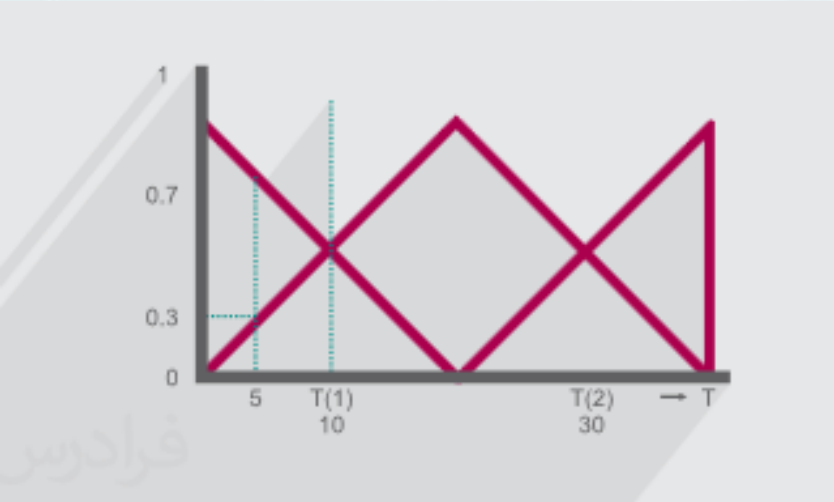
فرادرس

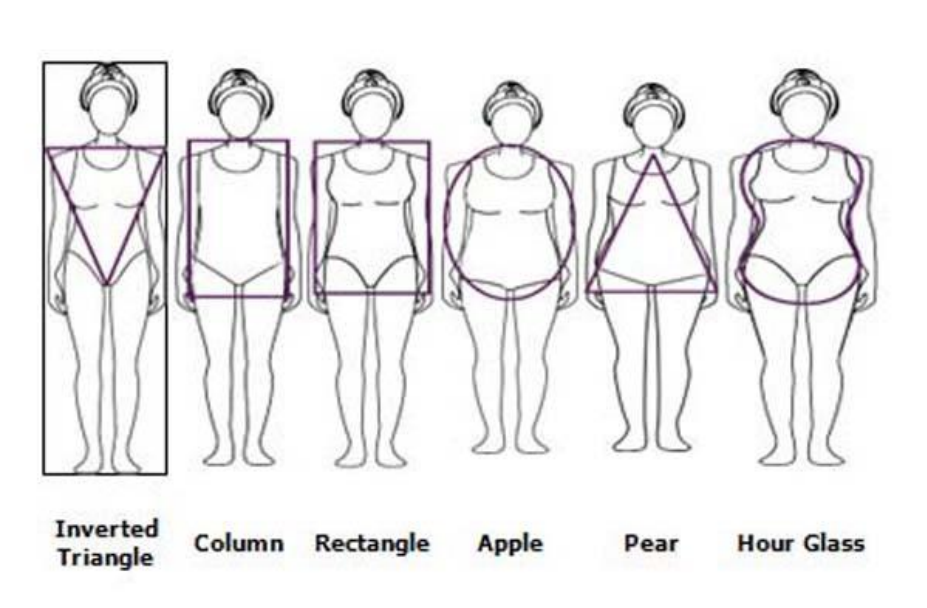
فرادرس بزرگ‌ترین ناشر دیجیتال آموزش‌های تخصصی، دانشگاهی و مهندسی است.

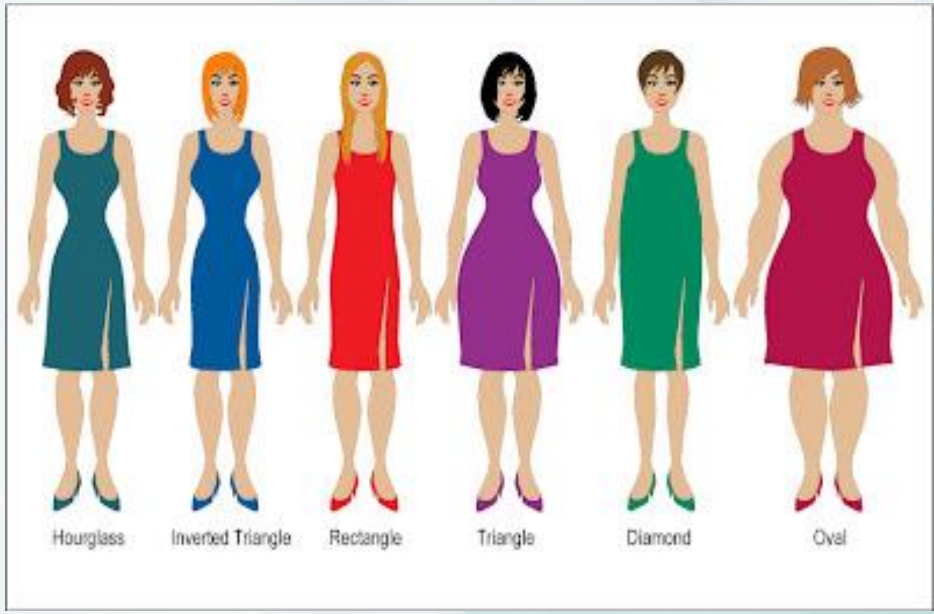
فیلم آموزشی ضبط شده کارگاه طراحی و پیاده سازی سیستم های فازی در متلب (رایگان)

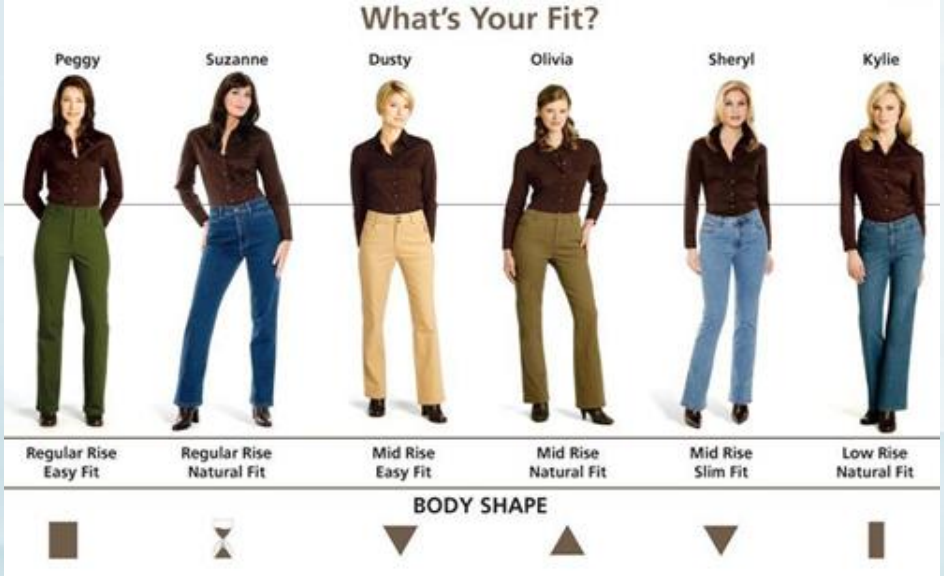


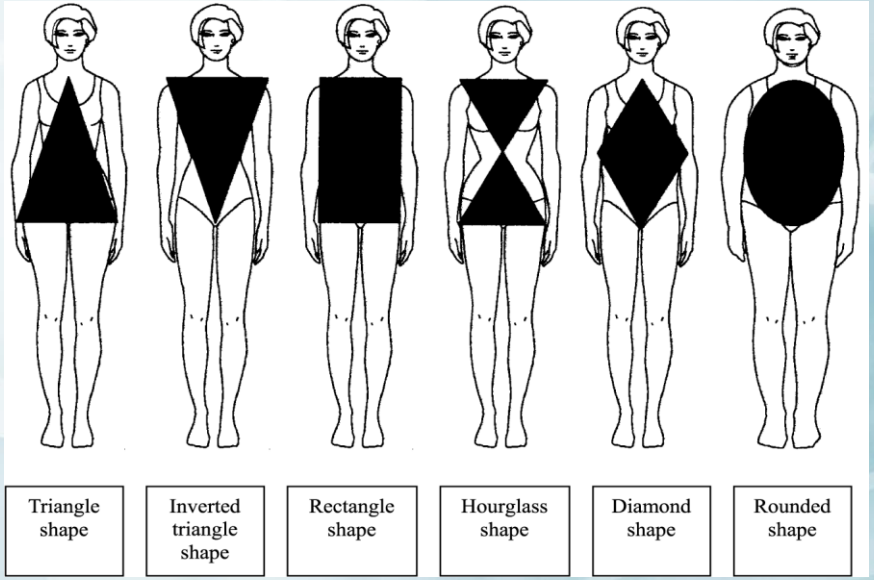
https://faradars.org/courses/mvwfz9106-workshop-on-fuzzy-system-implementation-in-matlab


TIPS FOR
DRESSING
FOR YOUR
BODY
TYPE

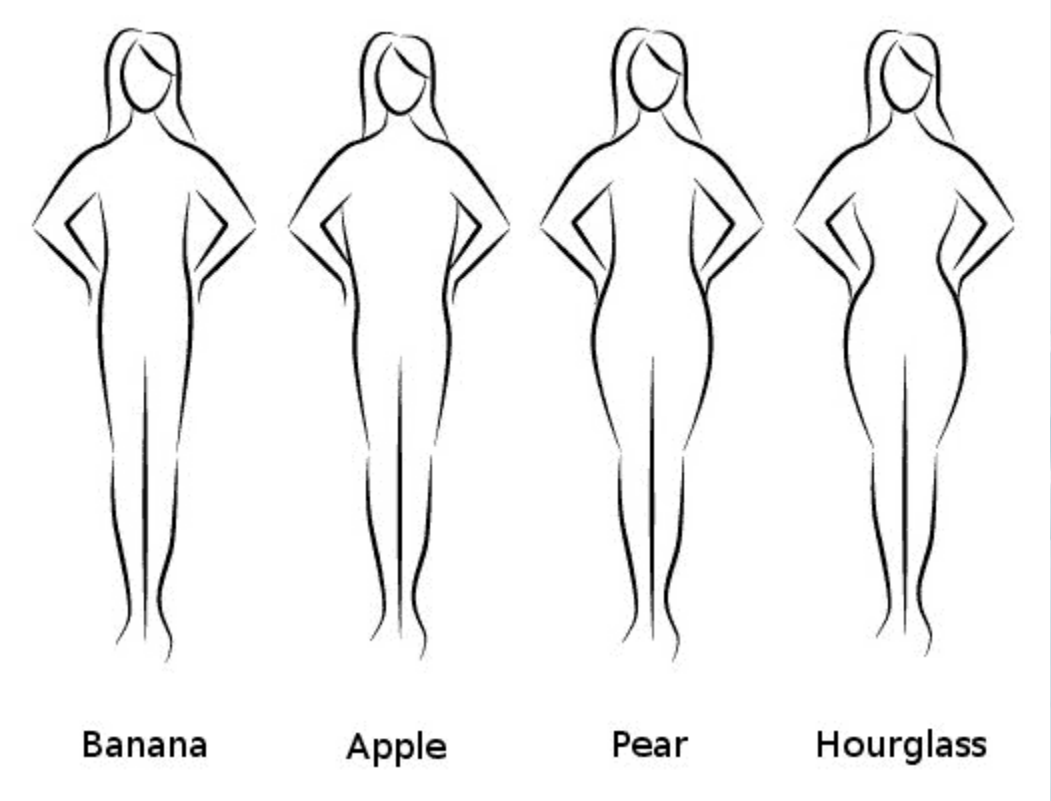

Inverted Triangle
Column
Rectangle
Apple
Pear
Hour Glass


Hourglass
Inverted Triangle
Rectangle
Triangle
Diamond
Oval


What's Your Fit?
Peggy
Suzanne
Dusty
Olivia
Sheryl
Kylie
Regular Rise Easy Fit
Regular Rise Natural Fit
Mid Rise Easy Fit
Mid Rise Natural Fit
Mid Rise Slim Fit
Low Rise Natural Fit
BODY SHAPE


Triangle shape
Inverted triangle shape
Rectangle shape
Hourglass shape
Diamond shape
Rounded shape

THE BEST SKIRT FOR YOUR BODY TYPE




envelope / min
banana shaped
full volume
apple shaped
high-waisted
pear shaped
pencil
hourglass shape

THE BEST *Swimsuit* FOR YOUR BODY TYPE

by MICHELLE PHAN.com

ONE PIECE

banana shaped

apple shaped

TWO PIECE

apple shaped

pear shaped

hourglass shaped

Click on the body types below and decide which is closest to yours.

HOURGLASS

CURVACEOUS WITH FULL BUST, DEFINED WAIST, FULL HIPS

WHICH STYLES FLATTER ME THE MOST?

FIT AND FLARE DRESS

SHEATH DRESS

shop all dresses that flatter the hourglass silhouette ▸

DRESS GLOSSARY: *WHAT DO THEY MEAN & HOW DO THEY FIT?*

A-LINE DRESS
- gently skims bustline
- flares out gradually to hem
- disguises waist, flatters hips

EMPIRE WAIST DRESS
- high waist seam
- gives illusion of length
- makes waist seem narrower

SHEATH DRESS
- follows curves of body
- gives waist definition
- accentuates your curves

SHIFT DRESS
- straight silhouette
- no waist definition
- flatters most body types

FIT AND FLARE DRESS
- fitted at bust
- gently shaped to the waist
- skirt flares to full sweep

WHICH DRESS SHOULD YOU MARRY?

by LAZARO

FIND OUT WHY

HOURGLASS

MERMAID/TRUMPET A-LINE/PRINCESS COLUMN/SHEATH

TALL AND THIN

MERMAID/TRUMPET COLUMN/SHEATH BALL GOWN

PETITE

COLUMN/SHEATH A-LINE/PRINCESS EMPIRE WAIST

APPLE

A-LINE/PRINCESS BALL GOWN EMPIRE WAIST

TALL AND

MERMAID/TRUMPET COLUMN/SHEATH BALL GOWN

PETITE

COLUMN/SHEATH A-LINE/PRINCESS EMPIRE WAIST

APPLE

A-LINE/PRINCESS BALL GOWN EMPIRE WAIST

PEAR

A-LINE/PRINCESS BALL GOWN EMPIRE WAIST

FULL FIGURE

A-LINE/PRINCESS EMPIRE WAIST


Petite


Fuller Figure


Long & Leggy


Apple


Pear / Houreglass

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