Fuzzy numbers are of great importance in fuzzy systems. The real numbers and closed intervals are special cases of fuzzy numbers. The fuzzy numbers usually used in applications are the triangular (shaped) and the trapezoidal (shaped) fuzzy numbers.

Fuzzy number

Fuzzy number are very special fuzzy subsets of the real numbers. For example,

a fuzzy number expressing approximately 2 is in Figure 1, and another fuzzy number (also called a fuzzy interval) for approximately between 2 and 4 is shown in Figure 2.

A Fuzzy number A is a fuzzy set on the real line R, must satisfy the following conditions.

(i) $\mu_A(x_0)$ is piecewise continous

(ii) There exist at least one $x_0 \in R$ with $\mu_A(x_0) = 1$

(iii) A must be normal and convex

Fuzzy Number denoted A=$[a_1, a_2, a_3]$

The general definition of a fuzzy number N is a fuzzy subset of R and:

    1. The core of N is non-empty;

    2. a-cuts of N are all closed, bounded, intervals; and

    3. the support of N is bounded.

Fuzzy number هي مجموعات جزئية ضبابية خاصة جدًا من الأعداد الحقيقية. على سبيل المثال، يوجد رقم ضبابي يعبر عن 2 تقريبًا في الشكل 1، كما يظهر في الشكل2 رقم ضبابي آخر (يسمى أيضًا fuzzy interval) تقريبًا بين 2 و4.

Interval A=$[a_1, a_3]$, $a_1, a_3 \in R$, $a_1 < a_3$

It is represented as the following membership function: