Consistency

Consistency refers to the degree to which it can be said that a certain condition is always correctly judged to be included in another condition (i.e., a sufficient condition). In set theory, it refers to the degree to which the judgment that one set is a subset of another set is always correct. If set A is a subset of set B, members in set A must met condition B in addition to their unique conditions of A, so the degree of membership of set A should be smaller than the degree of membership in B. Therefore, the membership value of the intersection of sets A and B will be the membership value of set A (the smaller one). Of course, the assumption that the degree of membership of set A is always small is based on a crisp (binary) perspective. Since the degree is a fuzzy value, it cannot be said that the membership value of set A is consistently smaller. However, if the membership value of set A is consistently smaller for any case, it is reasonable to consider that set A is a subset of set B (included). If the membership value of the intersection of sets A and B is that of set B (if the membership value of set B is smaller than that of set A), the idea that set A is a subset of set B loses consistency. If the idea that set A is a subset of set B is consistent for all cases, the total membership value of the intersection of sets A and B should match the total membership value of set A. If the total membership value of the intersection of sets A and B is smaller than the total membership value of set A, the idea that set A is a subset of set B loses consistency to that extent. Therefore, the ratio of the total membership value of the intersection of sets A and B to the total membership value of set A represents the strength of the consistency of considering set A as a subset of set B. This is called consistency.

$$consistency\ of\ (A \subseteq B) = \frac{\sum min\big(\mu(A), \mu(B)\big)}{\sum \mu(A)}$$
