582 2020-01-16

$C \xleftarrow{0.8} A, B$

$C \xleftarrow{0.7} D, E$

5 propositions (A ... E)
two rules
certainties between 0 and 1

A 0.8 B 0.9 D 0.6 E 0.5

The first rule has 0.8 strength; the second one has 0.7 strength.
We want the compute the certainty of C
We use min to combine weights (certainties) of propositions in the premise of a rule
From the first rule, $\min(0.8, 0.9) = 0.8$
From the second " , $\min(0.6, 0.5) = 0.5$

<.

We then attenuate the certainty for each rule according to its strength. As attenuator, we use $\times$ (times).

So, the certainty of C from the first rule is

$\min(0.8, 0.9) \times 0.8 = 0.8 \times 0.8 = 0.64$

For rule 2, we obtain the following certainty of C:

$\min(0.6, 0.5) \times 0.7 = 0.5 \times 0.7 = 0.35$

For combinator, we use Max. So,

the certainty of C overall is $\max(0.64, 0.35) = 0.64$

The choices of functions (combinator, attenuator,

integrator) that we model are common ones.
Another common integrator is
probabilistic sum, $\oplus$, defined as

$$a \oplus b = a + b - ab.$$

Using this choice, we obtain $0.64 + 0.35 - (0.64 \times 0.35) =$
$= 0.99 - 0.224 = 0.766$

This is historically important, and
highly deprecated