

7. Dempster-Shafer model.

We are selecting a new employee from a set of 3 candidates named A, B and C. After analyzing some features of their curriculum we have the following mass function:

$$m(A)=0.3, m(B)=0.1, m(C)=0.1, m(AB)=0, m(AC)=0.4, m(BC)=0, m(ABC)=0.1$$

- Calculate the belief and plausibility for all the elements of the frame of discernment.
- We have to discard one of the candidates before continuing with the personal interviews. Observing the certainty intervals, explain which candidate should be eliminated.
- Invent a new mass function that generates some conflict with the previous one. Show the combination matrix indicating where is the conflict.

a) $m(A)=0.3$
 $m(B)=0.1$
 $m(C)=0.1$
 $m(AC)=0.4$
 $m(ABC)=0.1$

	m_1	Bel	Pl
A	0.3	0.3	0.8
B	0.1	0.1	0.2
C	0.1	0.1	0.6
AB	0	0.4	0.9
AC	0.4	0.8	0.9
BC	0	0.2	0.7
ABC	0.1	1	1

b) eliminate B, because he has low belief with high certainty

c) To introduce conflict we assign mass to B,
 $m_2(B)=0.6$, $m_2(BC)=0.4$

$m_1 \backslash m_2$	A	B	C	AB	AC	BC	ABC
A	0.3	0.1	0.1	0	0.4	0	0.1
B	0.18	0.06	0.06	0	0.24	0	0.06
BC	0.12	0.04	0.04	0	0.16	0	0.04

	m_{1+2}	Bel	Pl.	
A	0	0	0	NO
B	0.4	0.4	0.5	Don't Know (?)
C	0.5	0.5	0.6	
AB	0	0.4	0.5	Low (?)
AC	0	0.5	0.6	
BC	0.1	1	1	High belief
ABC	0	1	1	

$$m_{1+2}(A) = 0$$

$$m_{1+2}(B) = 0.06 + 0.04 + 0.06 = 0.16$$

$$m_{1+2}(C) = 0.04 + 0.16 = 0.20$$

$$m_{1+2}(BC) = 0.04$$

rest $m=0$

$$K = 0.6$$

→ normalize

$$m(A) = 0 \quad \text{rest} = m = 0$$

$$m(B) = 0.16 / 0.4 = 0.4$$

$$m(C) = 0.2 / 0.4 = 0.5$$

$$m(BC) = 0.04 / 0.4 = 0.1$$