5th school on Belief Functions and Their Applications

La Certosa di Pontignano, Siena, Italy

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First Name:
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1 Multi-criteria decision-making support with belief functions [Jean Dezert]

Please answer the following questions by selecting the appropriate answer, or providing detailed answer as requested.

1.1 Which of the following probabilistic transformations of a belief mass m can be out of the belief interval bounds $[Bel, Pl]$?

- ☑ P_{Pl} transformation
- ☐ $BetP$ transformation
- ☑ P_m transformation
- ☐ $DSmP$ transformation

1.2 Consider a frame of discernment $\Theta = \{\theta_1, \ldots, \theta_n\}$ and suppose that there exists a $\theta_i \in \Theta$ such that $Bel(\theta_i) > 0$.

Can the probabilistic transformation $P_{Bel}(\theta_i) = \frac{Bel(\theta_i)}{\sum_{\theta_i \in \Theta} Bel(\theta_i)}$ be out of the belief interval bounds $[Bel(\theta_i), Pl(\theta_i)]$?

- ☑ Yes
- ☐ No

Hint: $\Theta = \{A, B, C\}$ and $m(A) = 0.8$ and $m(B \cup C) = 0.2$

1.3 What is the weighting vector of OWA approach corresponding to pessimistic decisional attitude?

- ☐ $\mathbf{w} = [1\ 0 \ldots 0\ 0]$
- ☑ $\mathbf{w} = [0\ 0 \ldots 0\ 1]$
- ☐ $\mathbf{w} = [0.5\ 0 \ldots 0\ 0.5]$

1.4 Is there an MCDM method developed so far robust to rank reversal?

☑ Yes ☐ No

1.5 What is the total mass of disagreement between two criteria C_j and $C_{j'}$ relatively to a given hypothesis A_i?

☐ $m_{ij}(A_i)m_{ij'}(A_i) + m_{ij}(\bar{A}_i)m_{ij'}(\bar{A}_i)$ ☑ $m_{ij}(A_i)m_{ij'}(\bar{A}_i) + m_{ij}(\bar{A}_i)m_{ij'}(A_i)$

☐ $m_{ij}(\bar{A}_i)m_{ij'}(A_i)$ ☐ $m_{ij}(A_i)m_{ij'}(\bar{A}_i)$

1.6 Can we always simplify an MCDM problem by the Inter-Criteria analysis?

☐ Yes ☑ No