

LIBER AMICORUM

REASONING UNDER PARTIAL KNOWLEDGE

CONFERENCE IN HONOR OF GIULIANELLA COLETTI'S 70TH BIRTHDAY

December 14-15, 2018

Department of Mathematics and Computer Science (University of Perugia, Perugia)
and Palazzo Trinci (Foligno)

Contents

1	The Colleague and friend Bernadette Bouchon-Meunier	2
2	Finitely additive mixtures of probability measures by Patrizia Berti and Pietro Rigo	6
3	TO BE OR NOT TO BE...coherent ! by Andrea Capotorti	8
4	Giulianella: da Allieva a Maestra ! by Francesca Conti	11
5	Indifference pricing of life insurance contracts via BSDEs under partial information by Alessandra Cretarola	12
6	A fresh look at some Machine Learning techniques from the perspective of Dempster-Shafer theory by Thierry Denoeux	13
7	Giulianella and the role of infinitesimals in describing uncertainty by Antonio Di Nola	14
8	On G. Coletti's contributions: from probability to possibility by Didier Dubois	15
9	On (strict) coherence: probability, geometry and logic by Tommaso Flaminio	18
10	A 3D civic medium platform for the regeneration of urban parks by Osvaldo Gervasi, Sergio Tasso and MariaElena Menconi	19
11	Algebraic aspects and coherence conditions for conjunctions among conditional events by Angelo Gilio and Giuseppe Sanfilippo	20
12	Boolean algebras of conditionals: atomic structure, probability and logic by Lluís Godó	21
13	Multiple selves preference models in decision analysis, decision theory and probabilistic models by Salvatore Greco	22
14	Decomposition and Composition of Knowledge by Radim Jiroušek	23
15	Defining Giulianella Coletti: a graphical representation with partial knowledge by Alfredo Milani e Valentina Poggioni	24
	15.1 The Plain Model	24
	15.2 The Bidimensional Structured Model	24
	15.3 The definitive Model	25
	15.4 Conclusion	25
16	To the "Prof" by Davide Petturiti	27
17	Connexivity under coherence by Niki Pfeifer	29
18	Idempotent copulae by Carlo Sempì	30
19	A conflictual but long-lasting empathy with Giulianella by Romano Scozzafava	31
20	Probabilistic meaning of copula-based extension of fuzzy measures. The point of view of multi-state reliability systems by Fabio L. Spizzichino	32
21	To the teacher, colleague and good friend for the life Giulianella by Barbara Vantaggi	33

Chapter 11

Algebraic aspects and coherence conditions for conjunctions among conditional events by Angelo Gilio and Giuseppe Sanfilippo

We deepen the study of a notion of conjunction among conditional events, introduced in previous papers in the framework of coherence. This notion of conjunction, differently from other approaches, is given in the setting of conditional random quantities. We show that some well known properties which are satisfied by conjunctions of unconditional events are also satisfied by conjunctions of conditional events. In particular we examine an additive property and a decomposition formula, by also obtaining a generalized inclusion-exclusion formula. Then, by exploiting the notion of conjunction, we introduce the set of constituents generated by n conditional events. Moreover, under logical independence, we give a necessary and sufficient condition of coherence for the prevision assessments on a family \mathcal{F} constituted by n conditional events and all possible conjunctions among some of them. This condition of coherence has a simple geometrical characterization in terms of a suitable convex hull. Such a characterization amounts to the solvability of a linear system as in the case of unconditional events. Then, we illustrate the set of all coherent assessments on the family \mathcal{F} by a list of linear inequalities on the components of the prevision assessment. Finally, given a coherent assessment \mathcal{M} on \mathcal{F} , we show that every possible value of the random vector associated with \mathcal{F} is itself a particular coherent assessment on \mathcal{F} .

Angelo Gilio

Department SBAI

University of Rome "La Sapienza", Rome, Italy

angelo.gilio@sbai.uniroma1.it

Giuseppe Sanfilippo

Department of Mathematics and Computer Science

University of Palermo, Italy

giuseppe.sanfilippo@unipa.it