CORRIGENDUM FOR 'CONDITIONING, UPDATING, AND LOWER PROBABILITY ZERO'

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ABSTRACT. This document lists errors in Reference [1] and corrects them.

ERRORS AND THEIR CORRECTIONS

In Section 2.2.4 of Reference [1], we state that conditions C1–C4 can be used to characterise the coherence of a conditional lower prevision $\underline{P}(\cdot\rfloor\cdot)$. Although this statement is correct, our explicit formulation of it is not. The correct version goes as follows:

Conditions C1–C4 have a special status because—as the following result by Troffaes and De Cooman establishes—they can be used to characterise coherence.

Proposition 5. (See [32, Theorem 13.33]—[2, Theorem 13.33] in this corrigendum.) *Consider a non-empty subset $\mathscr{B}$ of $\mathscr{P}_{\emptyset}(\Omega)$ that is closed under finite unions and a linear subpace $\mathscr{K}$ of $\mathscr{G}(\Omega)$ such that $\mathbb{I}_B \in \mathscr{K}$ and $f\mathbb{I}_B \in \mathscr{K}$ for all $f \in \mathscr{K}$ and $B \in \mathscr{B}$. Let $\underline{P}(\cdot\rfloor\cdot)$ be a conditional lower prevision with domain $\mathscr{C} := \{(f,B)\colon B \in \mathscr{B} \text{ and } f \in \mathscr{K}_B\}$ where, for all $B \in \mathscr{B}$, $\mathscr{K}_B := \{f \in \mathscr{G}(B)\colon \mathbb{I}_B f \in \mathscr{K}\}$. Then $\underline{P}(\cdot\rfloor\cdot)$ is coherent if and only if it satisfies* C1–C4. *Furthermore, for any $B \in \mathscr{B}$, $\underline{P}(\cdot\rfloor B)$ is coherent if and only if it satisfies* C1–C3. *Hence, in this particular case, $\underline{P}(\cdot\rfloor\cdot)$ is jointly coherent if and only if it is separately coherent and satisfies* C4.

Our formulation in Section 2.2.4 of Reference [1] stated an incorrect variation to this result that imposes less constraints on the domain $\mathscr{C}$, and wrongly attributed that result to Williams. In Section 2.3 of Reference [1], we state a corollary of Proposition 5 that inherits its problems; it should be adapted similarly. The correct version goes as follows:

Corollary 6. *Consider a non-empty subset $\mathscr{B}$ of $\mathscr{P}_{\emptyset}(\Omega)$ that is closed under finite unions and a linear subpace $\mathscr{K}$ of $\mathscr{G}(\Omega)$ such that $\mathbb{I}_B \in \mathscr{K}$ and $f\mathbb{I}_B \in \mathscr{K}$ for all $f \in \mathscr{K}$ and $B \in \mathscr{B}$. Let $P(\cdot\rfloor\cdot)$ be a conditional prevision with domain $\mathscr{C} := \{(f,B)\colon B \in \mathscr{B} \text{ and } f \in \mathscr{K}_B\}$ where, for all $B \in \mathscr{B}$, $\mathscr{K}_B := \{f \in \mathscr{G}(B)\colon \mathbb{I}_B f \in \mathscr{K}\}$. Then $P(\cdot\rfloor\cdot)$ is coherent if and only if it satisfies* P1–P4. *Furthermore, for any $B \in \mathscr{B}$, $P(\cdot\rfloor B)$ is coherent if and only if it satisfies* P1–P3. *Hence, in this particular case, $P(\cdot\rfloor\cdot)$ is jointly coherent if and only if it is separately coherent and satisfies* P4.

Given these changes, Footnote 12 in Reference [1] should also be corrected. Instead of "He requires the domain to be of the form in Corollary 6.", it should state "He requires the domain to be of the form $\{(f,B)\colon B \in \mathscr{B}$ and $f \in \mathscr{K}_B\}$, with $\mathscr{B}$ a non-empty subset of $\mathscr{P}_{\emptyset}(\Omega)$ and, for all $B \in \mathscr{B}$, $\mathscr{K}_B$ a linear subspace of $\mathscr{G}(B)$."

REFERENCES

[1] Jasper De Bock and Gert de Cooman. Conditioning, updating and lower probability zero. *International Journal of Approximate Reasoning*, 67:1 – 36, 2015.
[2] Matthias C. M. Troffaes and Gert de Cooman. *Lower Previsions*. Wiley, 2014.