

Abstracting Gradual Typing: An Erratum

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1. Erratum: July 20, 2018

Section 6.4 of the POPL2016 paper Abstracting Gradual Typing has an erroneous proposition, whose falsity mildly affects some subsequent discussion. The following proposition and corollary are erroneous.

Proposition 1 (Erroneous). *Let $\langle \tilde{T}_1, \tilde{T}_{21} \rangle, \langle \tilde{T}_{22}, \tilde{T}_3 \rangle \in \text{EV}^{<}$ be evidence for consistent judgements, and let $\tilde{T}_2 = \tilde{T}_{21} \sqcap \tilde{T}_{22}$. Then:*

$$\Delta^{<}(\tilde{T}_1, \tilde{T}_2, \tilde{T}_3) = \langle \pi_1(\mathcal{I}_{<}(\tilde{T}_1, \tilde{T}_2)), \pi_2(\mathcal{I}_{<}(\tilde{T}_2, \tilde{T}_3)) \rangle.$$

Corollary 2 (Erroneous).

$$\langle \tilde{T}_1, \tilde{T}_{21} \rangle \circ^{<} \langle \tilde{T}_{22}, \tilde{T}_3 \rangle = \langle \pi_1(\mathcal{I}_{<}(\tilde{T}_1, \tilde{T}_2)), \pi_2(\mathcal{I}_{<}(\tilde{T}_2, \tilde{T}_3)) \rangle.$$

where $\tilde{T}_2 = \tilde{T}_{21} \sqcap \tilde{T}_{22}$.

Corrected versions of the above proposition and corollary follow:

Proposition 3 (Corrected). *Let $\langle \tilde{T}_1, \tilde{T}_{21} \rangle, \langle \tilde{T}_{22}, \tilde{T}_3 \rangle \in \text{EV}^{<}$ be evidence for consistent judgements, and let $\tilde{T}_2 = \tilde{T}_{21} \sqcap \tilde{T}_{22}$. Then:*

$$\Delta^{<}(\tilde{T}_1, \tilde{T}_2, \tilde{T}_3) = \mathcal{I}_{<}(\pi_1(\mathcal{I}_{<}(\tilde{T}_1, \tilde{T}_2)), \pi_2(\mathcal{I}_{<}(\tilde{T}_2, \tilde{T}_3))).$$

Corollary 4 (Corrected).

$$\langle \tilde{T}_1, \tilde{T}_{21} \rangle \circ^{<} \langle \tilde{T}_{22}, \tilde{T}_3 \rangle = \mathcal{I}_{<}(\pi_1(\mathcal{I}_{<}(\tilde{T}_1, \tilde{T}_2)), \pi_2(\mathcal{I}_{<}(\tilde{T}_2, \tilde{T}_3))).$$

where $\tilde{T}_2 = \tilde{T}_{21} \sqcap \tilde{T}_{22}$.

However, the following theorem (regarding consistent equality) from the paper is correct.

Proposition 5.

$$\Delta^=(\tilde{T}_1, \tilde{T}_1 \sqcap \tilde{T}_2, \tilde{T}_2) = \langle \tilde{T}_1 \sqcap \tilde{T}_2, \tilde{T}_1 \sqcap \tilde{T}_2 \rangle.$$

The correction to this theorem affects subsequent discussion of the difference between gradual subtyping with and without rows: in particular, the theorem and corollary apply to *both* systems, not

just the system with gradual rows. So in fact, consistent transitivity in either case can be reduced to gradual meet \sqcap and interior $\mathcal{I}_{<}$.

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