Errata for: A Mathematical Framework for the Study of Coevolution

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Abstract

This document contains errata for the paper *A Mathematical Framework for the Study of Coevolution*, presented at the Foundations of Genetic Algorithms 7 workshop in Torremolinos, Spain.

Erratum 1 *Proposition 2.1 (MOO as Maximization)*

In the proof, the set F should be $\{\hat{s} \in S | \forall s \in S, s \preceq \hat{s}$ whenever the two are comparable$\}$. The aim is to capture the idea from MOO that "everybody is covered by somebody on the front." The remainder of the proof goes through unchanged. This is not a deep fact, just a translation from one terminology (ndf in MOO) to another (maximal elements in orders). $\square$

Erratum 2 *Example A.2 (appendix A)*

The pointwise order on $\mathbb{R}^2$ is given by: $(x_1, y_1) \leq (x_2, y_2) \iff x_1 \leq x_2 y_1 \leq y_2$. $\square$

Erratum 3 *Definition 2.5 (Informativeness)*

The condition for informativeness is broken. The most elegant way to fix it is to define $\diamond_R$ to be the set of all *incomparable pairs* in the preorder $\leq_R$. Then, define $\leq_1 \subseteq^{\diamond} \leq_2$ if $\diamond_2 \subseteq \diamond_1$; i.e., if $\leq_2$ has the same or fewer incomparable pairs as $\leq_1$. Note the reversal of indices. Similarly, write $\subseteq^{=}$ when $\sim_2 \subseteq \sim_1$. Then, define $\preceq = \subseteq^{\diamond} \wedge \subseteq^{=}$ (in the paper I had $\preceq = \subseteq \wedge \subseteq^{=}$). The aim here is to say that an order like $a \to b$ is more informative than both $a \diamond b$ and $a \leftrightarrow b$; the former says a and b are incomparable, whereas the latter says they are "the same." Either way, neither of these two say anything about how to put a and b in order, whereas $a \to b$ does. This condition puts more complicated orders into the proper informativeness order; for instance, $a \diamond b \leftrightarrow c \preceq a \to b \leftrightarrow c \preceq a \to b \to c$. It is clear this new definition of $\preceq$ is a preorder, and so definition 2.6 can remain unchanged. Theorem 2.7's proof would have been broken with the previous definition of informativeness, but it is OK with this one. $\square$

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