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Erratum to: An Exactly Solved Model for Recombination, Mutation and Selection

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The proof of Lemma 5 in reference [1] implicitly uses a property that is not stated as an assumption. Namely, even if the totally positive operator W satisfies $W = W_{<\alpha} \otimes W_{>\alpha}$, the relations

$$W_{<\alpha} \circ \pi_{<\alpha} = \pi_{<\alpha} \circ W \quad \text{and} \quad W_{>\alpha} \circ \pi_{>\alpha} = \pi_{>\alpha} \circ W$$

can only hold if both $W_{<\alpha}$ and $W_{>\alpha}$ are separately norm-preserving, at least for the positive measures. If one needs these relations for all links α, each W_m in $W = \bigotimes_{m=0}^{n} W_m$ must be norm-preserving on $\mathcal{M}_+(X_m)$, which was not stated and went unnoticed for a while.

A correct formulation of Lemma 5 thus reads as follows.

Lemma 5 *Let W be a strictly positive bounded linear operator on $\mathcal{M}^{\otimes}$ which has a complete tensor product structure, so that $W = W_0 \otimes \cdots \otimes W_n$. Then, given $\alpha \in L$, the elementary recombinator R_α commutes with W on $\mathcal{M}_+(X)$, if $W_{<\alpha}$ and $W_{>\alpha}$ are norm-preserving on $\mathcal{M}_+(X_{<\alpha})$ and $\mathcal{M}_+(X_{>\alpha})$. When all W_m are separately norm-preserving on $\mathcal{M}_+(X_m)$, one has $WR_\alpha = R_\alpha W$ on $\mathcal{M}_+(X)$ for all $\alpha \in L$.*

This has no further consequence for Section 4 of the paper, because the mutation operator Q is assumed to be a complete product of site-wise Markov generators, so that $\exp(tQ)$ is automatically norm-preserving on each site space separately.

Unfortunately, this is not so for Section 6 on the combination with a selection operator, as additive selection does *not* imply this additional property. Imposing site-wise norm-preservation to the semigroup generated by P, for instance in Lemma 6, removes the interesting degrees of freedom and brings the lemma back to the case of a Markov semigroup, up to free normalization constants per site. Theorem 6 suffers the same fate — and this part of the paper thus does not cover interesting cases of additive fitness.

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