ERRATUM TO "ON THE EDGE l_∞ RADIUS OF SAITOU AND NEI'S METHOD FOR PHYLOGENETIC RECONSTRUCTION" [THEORET. COMPUT. SCI. 369(1–3) (2006) 448–455]

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Theorem 2 of [2], which claims to settle Atteson's edge radius conjecture [1], is invalidly proven. The argument in [2] is inductive, and is based on the assumption that if initially $||\hat{D} - D_T||_\infty < \frac{l(e)}{4}$ then as the algorithm proceeds, the intermediate distance matrices obtained by agglomeration are within l_∞ distance $\frac{l(e)}{4}$ from some tree metric (this point is in fact not explicitly stated in [2]). Such a result holds in the case where one is proving the standard radius bound (Lemma 7 in [1]), since in that case there is a guarantee of only collapsing pairs of nodes forming a cherry in the correct model tree.

However, the analysis fails for the edge radius argument because the agglomerated leaves at any step may not form a cherry. In this case, it is not at all obvious how to find a reduced model topology T' that is consistent in some weak sense with the initial model tree and that allows the continuation of the induction argument by satisfying $||\hat{D}' - D_{T'}||_\infty < \frac{l(e)}{4}$ (where $\hat{D}'$ is the result of the collapsing step on on the distance matrix D'). In fact, in Theorem 34 in [3] we provide an example in which such a tree does not exist. Our example shows that the intermediate distance matrices may be further than $\frac{l(e)}{4}$ from *any* tree metric. This presents a problem not only for the proof of Theorem 2 of [2], but also for Theorem 4 of [4].

The edge radius theorem can be proved inductively by relaxing the hypothesis, as is done in Theorem 25 of [3].

References

[1] K Atteson, *The performance of neighbor-joining methods of phylogenetic reconstruction*, Algorithmica **25** (1999), 251–278.
[2] W Dai and Y Xu and B Zhu, *On the edge l_∞ radius of Saitou and Nei's method for phylogenetic reconstruction*, Theoretical Computer Science **369** (2006), no. 1–3, 448–455.
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