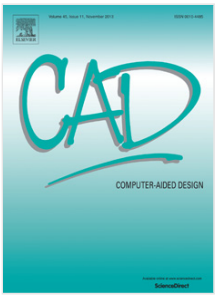

Comment on “Clarification on the short communication “On computing the shortest path in a multiply-connected domain having curved boundaries” ”

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Clarification on the short communication "On computing the shortest path in a multiply-connected domain having curved boundaries"

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The paper [1] has pointed out couple of errors in our paper titled "Shortest path in a multiply-connected domain having curved boundaries", *Computer-Aided Design, 45 (3), March 2013, pp. 723-732*. We would like to clarify the points raised by [1]. The authors of [1] claim that "exterior region elimination, cannot be applied in general to derive the correct shortest interior path" which is incorrect. We have shown with sufficient proof and with good deal of implemented examples to illustrate the generality of the algorithm.

[1] claims problem with exterior region elimination:

There seems to be a misinterpretation of exterior region elimination. Based on lemma 4 of our paper (lemma has been substantiated with proof), we identify regions that would not play a role in the shortest path and associate the regions with the **concave portion of a curve (this is the point that the authors of [1] seem to have missed)**. **The regions eliminated are only for paths that use the associated concave portion**. Figures 5 (a) and (b) (from our paper) illustrates this idea. In Figure 5(a), the curve (pointed with an arrow in Figure 5(a)) is not used for all the potential paths shown in Figure 5(a), where as this curve clearly plays a role in the final SIP (as indicated by Figures 7(i) and 7(j)), indicating that this curve (pointed with arrow mark) does not get eliminated altogether, as what the authors of [1] have claimed in their paper (Section 3). Similar arguments hold good for curves/paths in Figure 5(b). We do not miss any path that might contribute to the SIP because of exterior region elimination, contrary to what [1] has claimed.

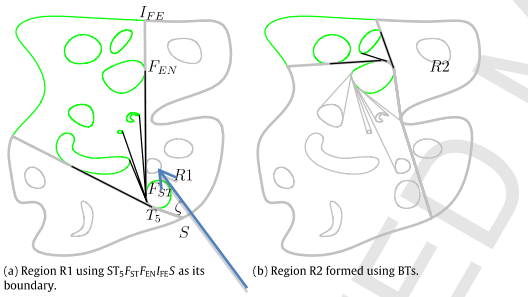

Figure 5.

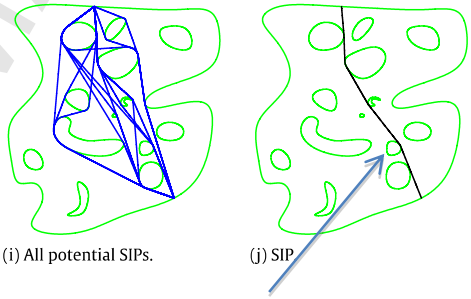

Figure 7.

[1] claims error in complexity analysis

Our analysis is **only** based on the possible number of tangents T (and not actually on how it is arrived at), as opposed to what authors' of [1] have done. Here, when computing T, we have mentioned that `n' as the number of concave portions from only the outer boundary, where `n' should have taken into account the concave portions from inner boundary as well, as pointed out by them. Nevertheless, this would affect only the number of tangents and not our entire analysis itself. Though we have missed some tangents in the analysis, they were never missed in implementation (For example, Figure 8(e) which has somewhat similar topology to the `gear tooth' meshing as Figure 2 in [1]).

The abstract of [1] gives an impression that our SIP algorithm has a loss of generality, which is not correct. We have illustrated that the algorithm works in various cases and situtaions and also clearly indicate with examples and results that the exterior region elimination procedure is not wrong.

The authors of [1] have suggested some improvements based on a latest reasearch work (parametric way of identifying Visibility graph, ref [4] in [1], which appeared in June 2013, where as our paper has got published in March 2013 itself) along with the idea of using PCTs and BTs from our paper, which appear to be possible.

References:

[1] "On computing the shortest path in a multiply-connected domain having curved boundaries" by Xiangzhi Wei and Ajay Joneja.