Matej Marinko (many thanks!) pointed out that in the proof of Lemma 5, in the case when we look into vertices v_out at even level, we should check the level of v_in before continuing the search there. This is not mentioned in the journal publication. More  precisely, in line 16 of the proof of Lemma 5 we would replace

   "and v_in has not been explored yet, we recursively explore"

with something like

   "v_in has not been explored yet, and lambda(v_in)=lambda(v_out)+1,
    we recursively explore".

This will be corrected in v3 of the arXiv version at
https://arxiv.org/abs/2005.00858

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