Erratum for "Chasing the Rainbow Connection: Hardness, Algorithms, and Bounds"

Juho Lauri

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Abstract

This is a non-exhaustive list of issues and errors in my PhD thesis titled "Chasing the Rainbow Connection: Hardness, Algorithms, and Bounds" (2016).

List of known issues

- Table 4.2 mistakenly marks k-RVC as being in P for split graphs. This is a typo, and it should be marked NP-complete (for every $k \geq 2$). For a proof, see [1].

- The proof of Corollary 4.9 is wrong. In particular, unlike the proof claims, the instances produced have size loglinear in m resulting in no contradiction to ETH. Regrettably, this result is also cited in the introduction of [1, page 2]. (I thank Neeldhara Misra for the discussions and helping me discover the error).

- Proof of Proposition 5.2 is incorrect: the graph G can have vertices that are not dominated by an internal vertex of a dominating diametral path. Consequently, the proof only proves a weaker upper bound of $\operatorname{rvc}(G) \leq \operatorname{diam}(G) + 1$. We discuss this briefly in [1, page 12] as well. (I thank Pinar Heggernes and Paloma Lima for noticing the error).

- The proof of Lemma 5.21 contains an error. Thus, the later statement of Theorem 5.24 is not proved. However, I also do not know of a counterexample showing the theorem could not hold.

References

[1] P. Heggernes, D. Issac, J. Lauri, P. T. Lima, and E. J. van Leeuwen. Rainbow Vertex Coloring Bipartite Graphs and Chordal Graphs. In *43rd International Symposium on Mathematical Foundations of Computer Science (MFCS 2018)*, volume 117 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pages 83:1–83:13, 2018.