Errata to: $L(4, 3, 2, 1)$-Labeling for Simple Graphs

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- Page: 512. The following sentence is required to be added at the end of paragraph 1 in Sect. 1.

  "Some results of simple graphs with $L(4, 3, 2, 1)$ labeling can be found in [9]".

- Page: 513. "**Theorem 1**" should be read as "**Theorem 1** [6]".
- Page: 514. "**Theorem 2**" should be read as "**Theorem 2** [6]".
- Page: 515. The **Lemma 1** along with its proof in Sect. 3.3 should be read as:

Lemma 1 *For a path P_n on n vertices with $n \geq 7$, the minimal $L(4, 3, 2, 1)$-labeling number $\lambda(P_n)$ is at most* 13.

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Proof A labeling pattern $\{f(v_1), f(v_2), \ldots, f(v_7)\} = \{5, 9, 13, 3, 7, 11, 1\}$ exists for $n = 7$. Hence the lemma follows. □

Page: 515. The Theorem 3 and its proof for Case-IV and Case-V in Sect. 3.3 should be read as:

Theorem 3 *For a path, P_n on n vertices, the minimal* $L(4, 3, 2, 1)$*-labeling number* $\lambda(P_n)$ *is*

$$\lambda(P_n) = \begin{cases} 1 & \textit{if } \mathrm{n} = 1 \\ 5 & \textit{if } \mathrm{n} = 2 \\ 8 & \textit{if } \mathrm{n} = 3 \\ 9 & \textit{if } \mathrm{n} = 4 \\ 11 & \textit{if } \mathrm{n} = 5, 6, 7 \end{cases}$$

Proof

Case-IV: $n = 4$:
The labeling pattern $\{6, 1, 9, 4\}$ shows that $\lambda(P_n) \leq 9$ if $n = 4$. Let $V(P_n) = \{v_1, v_2, v_3, v_4\}$. $V(P_n)$ has two vertices of degree 2 and other two vertices of degree 1. If either $f(v_2)$ or $f(v_3)$ is 1 then either $f(v_4)$ or $f(v_1)$ will be at least 12, which is a contradiction. Similar contradiction will arrive if either $f(v_1)$ or $f(v_4)$ is set to 1.
Case-V: $n = 5, 6, 7$:
Since $\exists$ a labeling $\{8, 3, 11, 6, 1, 9, 4\}$, we can assume that $\lambda(P_n) \leq 11$ for $n = 5, 6, 7$. Let $f(v_i) = 1$ and either v_{i+1}, v_{i+2} or v_{i-1}, v_{i-2} exist. Now $\lambda(P_3) = 8$ implies that $f(v_{i+1})$ is either 5, 6, 7 or 8. For $L(3, 2, 1)$-labeling [6], note that the possibilities for $f(v_{i+1})$ is either 5, 6, 7 or 8. Therfore, the similar approach in [6] can be used to handle this case. □

- Page: 517. The **Claim 1** is not correct and hence the last line of the "**Abstract**" should be read as "This paper also presents an $L(4, 3, 2, 1)$-labeling algorithm for path."

Reference

9. Sweetly, R.: A study on radio labeling and related concepts in graphs. PhD thesis, Manonmaniam Sundaranar University (2011)