Referee report of the master thesis

Distance Magic Labelings by Hayden Pfeiffer

The thesis focuses on the topic of distance magic labeling of graphs. A new framework based on linear algebra is developed to determine whether distance magic labeling exists for specific graphs. In the thesis, the ideas are applied to hypercubes and other Cayley graphs of Z_2^n. The obtained techniques enable the author to establish new proofs for previously known results. Unfortunately, no new results are obtained.

The first chapter (Preliminaries) leaves a lot of fundamental notions hidden. Definitions are not structured well (undefined terms used to define others etc.), some terms are not defined (adjacency matrix, digraphs), and some are confusing or incorrect, for instance:

- page 6, line 18: $c \in Z_2^n$
- page 6, line -12: eigenvector has to be a nonzero vector
- in the description of elementary row operations on matrices at the bottom of page 6: $k = 0$ has to be omitted from row multiplication operation; on the other hand, it is enough to formulate row addition with $k = 1$ only, and row switching can be emulated by the remaining two operations
- page 7, the last paragraph: the size of a basis is unique
- page 8, the first par.: the inner product in vector spaces over finite fields does not exist

I would appreciate more self-contained and consistent fundaments of the studied topics.

Starting from Chapter 2, the thesis becomes more readable and the level of the details appropriate for this type of text. The language of the thesis is not conventional in mathematical texts. The author seems to be familiar with English but not with scientific writing.

I have a few particular comments:

- page 12, lines -3 and -2: use $\widehat{m}$ instead of m
- page 13, the first two paragraphs should be explained in more detail
- page 18, line -9: missing -1 in the second part of the equality
- page 20, Proposition 10 is referred to [9]. Is the proof also from [9] or is it a new proof?
- page 22, the same question on Proposition 12 ([2]); moreover, the fact $q \neq 0 \ (mod \ 4)$ is valid but could be explained
- page 39, the first paragraph of Conclusion: It is mentioned that the presented framework "is suitable for determining the existence of distance magic labelings for **all** Cayley graphs of Z_2^n". This is not sufficiently discussed in the text.

I recommend the acceptance of the thesis as the master thesis and suggest a grade of 2.

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