ON INTERVAL (1,1)-COLORING OF INCIDENTORS[1]

A.V. Pyatkin

Sobolev Institute of Mathematics SB RAS, Novosibirsk
e-mail: artem@math.nsc.ru

A proper edge coloring is called *interval* if at each vertex the set of the used colors forms an integral interval (i. e. the set of consecutive positive integers). The problem of finding an interval coloring was first considered in [1]. It was proved in [3] that this problem is NP-hard even for bipartite graphs. Note that in the case of the bipartite graphs this problem is motivated by the problem of finding a school schedule without gaps (the parts of the graph correspond to the sets of teachers and classes and an edge means that the teacher has a lesson in the class).

An *incidentor* in a graph is a pair (u, e) consisting of a vertex u an an e incident with it. So, each edge $e = uv$ has two incidentors: (u, e) and (v, e) that are called *mated* to each other. It is convenient to treat them as two halves of the edge e. Two distinct incidentors adjoining to the same vertex are called *adjacent*. An *interval* (1,1)-*coloring* of incidentors is a function from the set of incidentors into the set of colors such that all adjacent incidentors are colored by distinct colors that form an integral interval and the colors of every two mated incidentors differ exactly by 1. The main result of the paper is the following

Theorem. *If a graph has an interval edge coloring then it has an interval (1,1)-coloring of incidentors.*

It follows from this theorem that the conjecture posed in [2] that a subdivision of every interval colorable graph is also interval colorable, is true.

BIBLIOGRAPHY

1. A. S. Asratian, R. R. Kamalian, Investigation of interval edge-colorings of graphs, Journal of Combinatorial Theory. Series B, 1994. V. 62, № 1. P. 34–43.

2. P. Petrosyan, H. Khachatrian, Interval Non-edge-Colorable Bipartite Graphs and Multigraphs // Journal of Graph Theory, accepted. 2013. DOI: 10.1002/jgt.21759

3. S.V.Sevastianov, On interval edge colorability of a bipartite graph // Methods of discrete analysis in solving extremum problems, iss. 50, IM SB RAS, Novosibirsk, 1990. P. 61–72 (in Russian).

[1]The work was supported by RFBR (projects № 12-01-00090, № 12-01-00093, № 12-01-00184, № 13-07-00070)