

Face-antimagic labelings

A labeling of *type* $(1, 1, 1)$ assigns labels from the set $\{1, 2, 3, \dots, |V(G)| + |E(G)| + |F(G)|\}$ to the vertices, edges and faces of plane graph G in such a way that each vertex, edge and face receives exactly one label and each number is used exactly once as a label.

A labeling of *type* $(1, 1, 0)$ is a bijection from the set $\{1, 2, 3, \dots, |V(G)| + |E(G)|\}$ to the vertices and edges of plane graph G .

If we label only vertices (respectively edges, faces) we call such a labeling a *vertex* (respectively *edge*, *face*) labeling and also the labeling is said to be of *type* $(1, 0, 0)$ (respectively *type* $(0, 1, 0)$, *type* $(0, 0, 1)$)).

The *weight* of a face under a labeling is the sum of labels (if present) carried by that face and the edges and vertices surrounding it.

A labeling of plane graph G is called *d-antimagic* if for every number s the set of s -sided face weights is $W_s = \{a_s, a_s + d, a_s + 2d, \dots, a_s + (f_s - 1)d\}$ for some integers a_s and d , $d \geq 0$, where f_s is the number of s -sided faces.

We allow different sets W_s for different s . If s is the same for each face, then there is just one arithmetic sequence comprising the set of face weights and we may speak of a graph being (a, d) -*face antimagic*. Many common types of plane graphs have "almost" all faces the same, for example, the prism which consists of all-but-two 4-sided faces; or the antiprism which consists of all-but-two 3-sided faces. Such graphs are easily modified so that they contain all the same faces and so that we can consider (a, d) -face antimagic labeling on them.

If $d = 0$ then Ko-Wei Lih called such labeling *magic* (*face-magic*).

If $d = 1$ then d -antimagic labeling is called *consecutive*.

Face-antimagic labelings are investigated in the following papers:

- Bača, M. - Numan, M. - Shabbir, A.: *Labelings of type* $(1, 1, 1)$ *for toroidal fullerenes*, **Turkish Journal of Mathematics** **37** (2013), 899-907.
- Bača, M.- Numan, M.- Siddiqui, M.K.: *Super face antimagic labelings of union of antiprisms*, **Mathematics in Computer Science** **7**, No.2 (2013), 245-253.
- Bača, M. - Brankovic, L. - Lascsáková, M. - Phanalasy, O.- Semaničová-Feňovčíková, A.: *On d-antimagic labelings of plane graphs*, **Electronic Journal of Graph Theory and Applications** **1** No. 1 (2013), 28-39.
- Ahmad, A. - Bavca, M - Lascsáková, M. - Semaničová- Feňovčíková, A.: *Super magic and antimagic labelings of disjoint union of plane graphs*, **Science International** **24** Issue 1 (2012), 21-25.
- Ali, G. - Bača, M.- Bashir, F.- Semaničová- Feňovčíková, A.: *On face antimagic labelings of disjoint union of prisms*, **Utilitas Math.** **85** (2011), 97-112.
- Bača, M.- Bashir, F.- Semaničová, A.: *Face antimagic labelings of antiprisms*, **Utilitas Math.** **84** (2011), 209-224.
- Bača, M.- Brankovic, L. - Semaničová-Feňovčíková, A.: *Labelings of plane graphs containing Hamilton path*, **Acta Math. Sinica - English Series** **27**, Issue 4 (2011), 701-714.
- Bača, M.- Miller, M.- Phanalasy, O.- Semaničová-Feňovčíková, A.: *Super d-antimagic labelings of disconnected plane graphs*, **Acta Math. Sinica - English Series** **26**, Issue 12 (2010), 2283-2294.
- Bača, M.- Bashir, F.: *On super d-antimagic labelings of disjoint union of*

prisms, **AKCE J. Graphs. Combin.** **6**, No.1 (2009), 31-39.

• Bača, M.- Lin, Y.- Miller, M.: *Antimagic labelings of grids*, **Utilitas Math.** **72**, (2007), 65-75.

• Bača, M.- Baskoro, E.T.- Cholily, Y.M.: *On d -antimagic labelings for a special class of plane graphs*, **The Journal of Combinatorial Mathematics and Combinatorial Computing (JCMCC)** **61**, (2007), 21-32.

• Sugeng, K.A. - Miller, M. - Lin, Y. - Bača, M.: *Face antimagic labelings of prisms*, **Utilitas Math.** **71**, (2006), 269-286.

• Bača, M. - Lin, Y. - Miller, M. - Ryan, J.: *Antimagic labelings of Mobius grids*, **Ars Combin.** **78** (2006), 3-13.

• Bača, M.: *On face antimagic labelings of plane graphs*, **The Journal of Combinatorial Mathematics and Combinatorial Computing (JCMCC)** **53**, (2005), 33-38.

• Bača, M. - Baskoro, E.T.- Cholily, Y.M.- Jendrol, S.- Lin, Y.- Miller, M.- Ryan, J.- Simanjuntak, R.- Slamini - Sugeng, K.A.: *Conjectures and Open Problems on Face Antimagic Evaluations of Graphs*, **Journal of Indonesian Math. Society (MIHMI)**, Vol. **11**, No. **2**, (2005), 175-192.

• Bača, M. - Baskoro, E.T. - Miller, M.: *Antimagic valuations for the special class of plane graphs*, **Lecture Notes in Computer Science - LNCS 3330**, (2005), 58-64.

• Bača, M.- Baskoro, E.T.- Cholily, Y.M.: *Face antimagic labelings for a special class of plane graphs $C(a,b)$* , **The Journal of Combinatorial Mathematics and Combinatorial Computing (JCMCC)** **55**, (2005), 5-15.

• Bača, M. - Jendroľ, S. - Miller, M. - Ryan, J.: *Antimagic labelings of generalized Petersen graphs that are plane*, **Ars Combin.** **73** (2004), 115-128.

• Bača, M. - Baskoro, E.T. - Jendroľ, S. - Miller, M.: *Antimagic labelings of hexagonal planar maps*, **Utilitas Math.** **66** (2004), 231-238.

• Lin, Y. - Slamini - Bača, M. - Miller, M.: *On d -antimagic labelings of prisms*, **Ars Combin.** **72** (2004), 65-76.

• Bača, M. - Miller, M.: *On d -antimagic labelings of type $(1, 1, 1)$ for prisms*, **The Journal of Combinatorial Mathematics and Combinatorial Computing (JCMCC)** **44**, (2003), 199-207.

• Bača, M. - Miller, M.: *Antimagic face labeling of convex polytopes based on biprisms*, **The Journal of Combinatorial Mathematics and Combinatorial Computing (JCMCC)** **36**, (2001), 229-236.

• Bača, M.: *Special face numbering of plane quartic graphs*, **Ars Combin.** **57**, (2000), 285-292.

• Bača, M.: *Consecutive-magic labeling of generalized Petersen graphs*, **Utilitas Math.** **58** (2000), 237-241.

• Bača, M. - MacDougall, J.A. - Miller, M. - Slamini - Wallis, W.D.: *Survey of certain valuations of graphs*, **Discussiones Math. Graph Theory** **20** (2000), 219-229.

• Bača, M.: *Face antimagic labelings of convex polytopes*, **Utilitas Math.** **55** (1999), 221-226.

• Bača, M. - Holländer, I.: *On (a,b) -consecutive Petersen graphs*, **Acta Mathematicae Applicatae Sinica**, Vol.14, No. **3** (1998), 265 - 270.

• Bača, M.: *Labelings of a certain class of convex polytopes*, **J. Franklin Inst.** **329** (1992), 539-547.

- Bača, M.: *On consecutive labeling of plane graphs*, **J. Franklin Inst.** **328** (1991), 249-253.
- Bača, M.: *On magic labelings of Mobius ladders*, **J. Franklin Inst.** **326** (1989), 885-888.
- Bača, M.: *On magic and consecutive labelings for the special classes of plane graphs*, **Utilitas Math.** **32** (1987), 59-65.