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Kauffman-Harary conjecture for alternating virtual knots. (English) Zbl 1335.57012

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A knot is *p-colorable* for a prime p if there is a coloring of the arcs in a diagram of the knot with integers mod p such that the colors on the undercrossing arcs at every crossing sum to twice the color on the overcrossing arc mod p and at least two distinct colors are used; this is equivalent to the existence of a surjective homomorphism from the fundamental kei of the knot to the Takasaki kei (also known as dihedral quandle or cyclic quandle) structure on the integers mod p. Not every diagram with such a coloring necessarily uses all of the colors, and one can define the minimal coloring number of a knot mod p to be the minimal number of colors used in a nontrivial p-coloring of a knot K over the set of all diagrams equivalent to K. A coloring is *heterogenous* if every arc has a different color, i.e. if the minimal coloring number equals the crossing number. In this paper, it is shown that alternating virtual knots with prime determinant p and without nugatory classical crossings have the Kauffman-Harary property, i.e., that nontrivial p-colorings of such knots are always heterogeneous.

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References:

[1] DOI: 10.1142/S0218216504003251 · Zbl 1095.57003 · doi:10.1142/S0218216504003251

[2] DOI: 10.1006/eujc.2000.0434 · Zbl 0968.05035 · doi:10.1006/eujc.2000.0434

[3] Dowdall N. E., Kobe J. Math. 27 pp 1– (2010)

[4] R. H.~Fox, Topology of 3-Manifolds and Related Topics, ed. M. K.~Fort~Jr. (Prentice-Hall, 1962)~pp. 120–167.

[5] DOI: 10.1016/S0040-9383(99)00054-3 · Zbl 1006.57005 · doi:10.1016/S0040-9383(99)00054-3

[6] DOI: 10.1006/aama.1998.0634 · Zbl 1128.57301 · doi:10.1006/aama.1998.0634

[7] DOI: 10.1016/0022-4049(82)90077-9 · Zbl 0474.57003 · doi:10.1016/0022-4049(82)90077-9

[8] DOI: 10.1006/eujc.1999.0314 · Zbl 0938.57006 · doi:10.1006/eujc.1999.0314

[9] DOI: 10.1016/j.aam.2006.11.006 · Zbl 1151.57008 · doi:10.1016/j.aam.2006.11.006

[10] Kauffman L. H., J. Knot Theory Ramifications 21 pp 17– (2012)

[11] Livingston C., Carus Mathematical Monographs, in: Knot Theory (1993)

[12] DOI: 10.2140/agt.2009.9.2027 · Zbl 1184.57006 · doi:10.2140/agt.2009.9.2027

[13] DOI: 10.1070/SM1984v047n01ABEH002630 · Zbl 0523.57006 · doi:10.1070/SM1984v047n01ABEH002630

[14] DOI: 10.1142/S0218216510008480 · Zbl 1220.57003 · doi:10.1142/S0218216510008480