



Also available at <http://amc-journal.eu>
ISSN 1855-3966 (printed ed.) ISSN 1855-3974 (electronic edn.)
ARS MATHEMATICA CONTEMPORANEA 14 (2018) 345–357

Alphabet-almost-simple 2-neighbour-transitive codes

Neil I. Gillespie

Heilbronn Institute for Mathematical Research, School of Mathematics, Howard House, University of Bristol, BS8 1SN, United Kingdom

Daniel R. Hawtin*

*Centre for the Mathematics of Symmetry and Computation,
University of Western Australia, 35 Stirling Highway, Crawley, WA 6009, Australia*

Abstract: Let X be a subgroup of the full automorphism group of the Hamming graph $H(m, q)$, and C a subset of the vertices of the Hamming graph. We say that C is an $(X, 2)$ -neighbour-transitive code if X is transitive on C , as well as C_1 and C_2 , the sets of vertices which are distance 1 and 2 from the code. It has been shown that, given an $(X, 2)$ -neighbour-transitive code C , there exists a subgroup of X with a 2-transitive action on the alphabet; this action is thus almost-simple or affine. This paper completes the classification of $(X, 2)$ -neighbour-transitive codes, with minimum distance at least 5, where the subgroup of X stabilising some entry has an almost-simple action on the alphabet in the stabilised entry. The main result of this paper states that the class of $(X, 2)$ neighbour-transitive codes with an almost-simple action on the alphabet and minimum distance at least 3 consists of one infinite family of well known codes.

Keywords: 2-neighbour-transitive, alphabet-almost-simple, automorphism groups, Hamming graph, completely transitive.

Math. Subj. Class.: 05E20, 68R05, 20B25

*This author was supported by an Australian Postgraduate Award and a University of Western Australia Safety-Net-Top-Up scholarship while this research was conducted, and would like to acknowledge an accommodation grant from the Heilbronn Institute for Mathematical Research.

E-mail addresses: neil.gillespie@bristol.ac.uk (Neil I. Gillespie), dan.hawtin@gmail.com (Daniel R. Hawtin).

Dostopno tudi na <http://amc-journal.eu>
ISSN 1855-3966 (tiskana izd.) ISSN 1855-3974 (elektronska izd.)
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Abecedne skoraj enostavne 2-sosednostno prehodne kode

Neil I. Gillespie

Heilbronn Institute for Mathematical Research, School of Mathematics, Howard House, University of Bristol, BS8 1SN, United Kingdom

Daniel R. Hawtin*

*Centre for the Mathematics of Symmetry and Computation,
University of Western Australia, 35 Stirling Highway, Crawley, WA 6009, Australia*

Povzetek: Naj bo X podgrupa polne grupe avtomorfizmov Hammingovega grafa $H(m, q)$, in C podmnožica vozlišč Hammingovega grafa. Rečemo, da je C $(X, 2)$ -sosednostno prehodna koda, če je X prehodna na C , kot tudi na C_1 in C_2 , množicah vozlišč, ki so na razdaljah 1 in 2 od koda. Pokazano je bilo, da če je dana $(X, 2)$ -sosednostno-prehoden koda C , potem obstaja podgrupa grupe X z 2-prehodnim delovanjem na abecedi; to delovanje je tako skoraj enostavno ali afino. Ta članek dopolnjuje klasifikacijo $(X, 2)$ -sosednostno prehodnih kod, z minimalno razdaljo najmanj 5, kjer podgrupa grupe X , ki stabilizira nekaj elementov, deluje skoraj enostavno na abecedi stabiliziranih elementov. Glavni rezultat tega članka pravi, da razred $(X, 2)$ -sosednostno prehodnih kod s skoraj enostavnim delovanjem na abecedi in minimalno razdaljo najmanj 3 sestoji iz ene neskončne družine dobro znanih kod.

Ključne besede: 2-sosednostno-prehoden, abecedno skoraj enostaven, grupe avtomorfizmov, Hammingov graf, popolnoma prehoden.

Math. Subj. Class.: 05E20, 68R05, 20B25

*Ta avtor je bil v času te raziskave podprt s strani Australian Postgraduate Award in University of Western Australia Safety-Net-Top-Up scholarship, in bi se rad zahvalil za namestitvena sredstva s strani Heilbronn Institute for Mathematical Research.

e-poštna naslova: neil.gillespie@bristol.ac.uk (Neil I. Gillespie), dan.hawtin@gmail.com (Daniel R. Hawtin).