

RAINBOW TETRAHEDRA IN CAYLEY GRAPHS

ITALO J. DEJTER

*University of Puerto Rico
Rio Piedras, PR 00936-8377*

e-mail: italo.dejter@gmail.com

Abstract

Let Γ_n be the complete undirected Cayley graph of the odd cyclic group $\mathbf{Z}_n$. Connected graphs whose vertices are rainbow tetrahedra in Γ_n are studied, with any two such vertices adjacent if and only if they share (as tetrahedra) precisely two distinct triangles. This yields graphs G of largest degree 6, asymptotic diameter $|V(G)|^{1/3}$ and almost all vertices with degree: (a) 6 in G ; (b) 4 in exactly six connected subgraphs of the $(3, 6, 3, 6)$ -semi-regular tessellation; and (c) 3 in exactly four connected subgraphs of the $\{6, 3\}$ -regular hexagonal tessellation. These vertices have as closed neighborhoods the union (in a fixed way) of closed neighborhoods in the ten respective resulting tessellations.

Keywords: rainbow triangles, rainbow tetrahedra, Cayley graphs.

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