

Girth-regular graphs*

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Abstract

We introduce a notion of a *girth-regular* graph as a k -regular graph for which there exists a non-descending sequence (a_1, a_2, \dots, a_k) (called the *signature*) giving, for every vertex u of the graph, the number of girth cycles the edges with end-vertex u lie on. Girth-regularity generalises two very different aspects of symmetry in graph theory: that of vertex transitivity and that of distance-regularity. For general girth-regular graphs, we give some results on the extremal cases of signatures. We then focus on the cubic case and provide a characterisation of cubic girth-regular graphs of girth up to 5.

Keywords: Graph, girth-regular, cubic, girth.

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Ožinsko regularni grafi*

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Povzetek

Ožinsko regularne grafe definiramo kot k -regularne grafe, za katere obstaja nepada-
joče zaporedje (a_1, a_2, \dots, a_k) (imenovano *podpis*), ki za vsako vozlišče u v grafu pove,
v koliko ožinskih ciklih (tj. ciklih najmanjše dolžine) ležijo povezave s krajiščem v vo-
zlišču u . Ožinska regularnost posplošuje dva zelo različna vidika simetrije v teoriji grafov:
vozliščno tranzitivnost in razdaljno regularnost. Za splošne ožinsko regularne grafe po-
damo nekaj rezultatov o ekstremalnih primerih podpisa. Nato se osredotočimo na kubične
ožinsko regularne grafe, za katere podamo karakterizacijo v primeru, ko je ožina največ 5.

Ključne besede: Graf, ožinska regularnost, kubični grafi, ožina.

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