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## Characterising CCA Sylow cyclic groups whose order is not divisible by four\*

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**Abstract:** A Cayley graph on a group  $G$  has a natural edge-colouring. We say that such a graph is *CCA* if every automorphism of the graph that preserves this edge-colouring is an element of the normaliser of the regular representation of  $G$ . A group  $G$  is then said to be *CCA* if every connected Cayley graph on  $G$  is *CCA*.

Our main result is a characterisation of non-*CCA* graphs on groups that are Sylow cyclic and whose order is not divisible by four. We also provide several new constructions of non-*CCA* graphs.

**Keywords:** *CCA* problem, Cayley graphs, edge-colouring, Sylow cyclic groups.

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## Karakteriziranje CCA sylowskih cikličnih grup, katerih red ni deljiv s štiri\*

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**Povzetek:** Cayleyev graf grupe  $G$  ima naravno barvanje povezav. Takšen graf imenujemo CCA graf, če je vsak avtomorfizem grafa, ki ohranja to barvanje povezav, element normalizatorja regularne reprezentacije grupe  $G$ . Grupi  $G$  pravimo CCA grupa, če je vsak povezan Cayleyev graf grupe  $G$  CCA graf.

Naš glavni rezultat je karakterizacija ne-CCA grafov grup, ki so sylowske ciklične grupe in katerih red ni deljiv s štiri. Podamo tudi številne nove konstrukcije ne-CCA grafov.

**Ključne besede:** CCA problem, Cayleyevi grafi, barvanje povezav, sylowske ciklične grupe.

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