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## Gray code numbers for graphs

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### Abstract

A graph  $H$  has a Gray code of  $k$ -colourings if it is possible to list all of its  $k$ -colourings in such a way that consecutive elements in the list differ in the colour of exactly one vertex. We prove that for any graph  $H$ , there is a least integer  $k_0(H)$  such that  $H$  has a Gray code of  $k$ -colourings whenever  $k \geq k_0(H)$ . We then determine  $k_0(H)$  whenever  $H$  is a complete graph, tree, or cycle.

**Keywords:** Graph colouring, cyclic Gray code.

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# Grayeva koda in $k$ -barvanja grafov

## Povzetek

Graf  $H$  ima Grayevo kodo  $k$ -barvanj, če lahko vsa  $k$ -barvanja nanizamo v takšnem vrstnem redu, da se zaporedna elementa tega seznama razlikujeta le v barvi enega vozlišča. Dokažemo, da za vsak graf  $H$  obstaja takšno najmanjše celo število  $k_0(H)$ , da ima  $H$  Grayevo kodo  $k$ -barvanj za vsak  $k \geq k_0(H)$ . Nato poiščemo  $k_0(H)$  v primerih, ko je  $H$  polni graf, drevo ali cikel.

Ključne besede: Barvanje grafa, ciklična Grayeva koda.