

Infinite benzenoids

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Abstract

A family of benzenoids, called *convex benzenoids*, was introduced in 2012 by Cruz, Gutman and Rada. In a later paper by the present author *et al.*, several equivalent characterisations of convex benzenoids have been given and their equivalence was proved. Along the way an *infinite* benzenoid called the *half-plane* was used for the purpose of theoretical reasoning. In this short paper, some properties of infinite benzenoids are discussed. It is proved that their boundary consists of countably many connected components. *Convex infinite* benzenoids are classified and it is proved that there are only *countably* many convex infinite benzenoids, whilst there are *uncountably* many infinite (non-convex) benzenoids. We also show that there are countably many infinite benzenoids which have a finite number of 1s in their *boundary-edges code*.

Keywords: Infinite benzenoid, hexagonal system, convex benzenoid, boundary-edges code, half-plane, countable set.

Math. Subj. Class.: 05C10, 92E10, 03E75

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Neskončni benzenoidi

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Povzetek

Družino benzenoidov, ki jim pravimo *konveksni benzenoidi*, so leta 2012 vpeljali Cruz, Gutman in Rada. V kasnejšem članku pričujočega avtorja in soavtorjev je podanih več ekvivalentnih karakterizacij konveksnih benzenoidov in dokazane so njihove ekvivalence. Za namen dokazovanja uvedejo *neskončni benzenoid*, ki mu pravijo *polravnina*. V tem kratkem članku razpravljamo o nekaterih lastnostih neskončnih benzenoidov. Dokažemo, da je rob neskončnega benzenoida sestavljen iz števno mnogo povezanih komponent. Klasificiramo *konveksne neskončne benzenoide* in dokažemo, da obstaja le *števno* mnogo konveksnih neskončnih benzenoidov, medtem ko je (ne-konveksnih) neskončnih benzenoidov *neštevno* mnogo. Pokažemo tudi, da obstaja števno mnogo neskončnih benzenoidov, ki imajo končno število simbolov 1 v svoji *kodi robnih povezav*.

Ključne besede: Neskončni benzenoid, šestkotniški sistem, konveksni benzenoid, koda robnih povezav, polravnina, števna množica.

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