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## Iterated claws have real-rooted genus polynomials

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**Abstract:** We prove that the genus polynomials of the graphs called *iterated claws* are real-rooted. This continues our work directed toward the 25-year-old conjecture that the genus distribution of every graph is log-concave. We have previously established log-concavity for sequences of graphs constructed by iterative vertex-amalgamation or iterative edge-amalgamation of graphs that satisfy a commonly observable condition on their partitioned genus distributions, even though it had been proved previously that iterative amalgamation does not always preserve real-rootedness of the genus polynomial of the iterated graph. In this paper, the iterated topological operation is adding a claw, rather than vertex- or edge-amalgamation. Our analysis here illustrates some advantages of employing a matrix representation of the transposition of a set of productions.

**Keywords:** Topological graph theory, graph genus polynomials, log-concavity, real-rootedness.

Math. Subj. Class.: 05A15, 05A20, 05C10



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## Iterirane klešče imajo rodovne polinome z realnimi koreni

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**Povzetek:** Dokažemo, da imajo rodovni polinomi grafov, imenovanih iterirane klešče, realne korene. To je nadaljevanje našega dela usmerjenega k 25 let stari domnevi, da je rodovna porazdelitev vsakega grafa log-konkavna. Pokazali smo že log-konkavnost za zaporedja grafov, konstruiranih z iterativno vozliščno amalgamacijo ali iterativno povezavno amalgamacijo grafov, ki zadoščajo zelo splošnemu pogoju glede njihovih particioniranih rodovnih porazdelitev, čeprav je bilo predhodno dokazano, da iterativna amalgamacija ne ohranja vselej realnosti korenov rodovnega polinoma iteriranega grafa. V tem članku je iterirana topološka operacija dodajanje klešč, ne pa vozliščna ali povezavna amalgamacija. Naša tukajšnja analiza ilustrira nekaj prednosti uporabe matrične reprezentacije transpozicije množice produkcij.

**Ključne besede:** Topološka teorija grafov, rodovni polinomi grafa, log-konkavnost, realni koreni.

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