

A short note on undirected Fitch graphs*

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Abstract

Fitch graphs have been introduced as a model of xenology relationships in phylogenomics. Directed Fitch graphs $G = (X, E)$ are digraphs that are explained by $\{0, 1\}$ -edge-labeled rooted trees with leaf set X : there is an arc $xy \in E$ if and only if the unique path in T that connects the least common ancestor $\text{lca}(x, y)$ of x and y with y contains at least one edge with label 1. In this contribution, we consider the undirected version of Fitch's xenology relation, in which x and y are xenologs if and only if the unique path between x and y in T contains an edge with label 1. We show that symmetric Fitch relations coincide with the class of complete multipartite graphs and thus cannot convey any non-trivial phylogenetic information.

Keywords: Labeled trees, forbidden subgraphs, phylogenetics, xenology, Fitch graph.

Math. Subj. Class.: 05C75, 05C05, 92B10

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Kratka opomba o neusmerjenih Fitchevih grafih*

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Povzetek

Fitchevi grafi so vpeljani kot model ksenoloških relacij v filogenomiki. Usmerjeni Fitchevi grafi $G = (X, E)$ so digrafi, definirani s pomočjo $\{0, 1\}$ -povezavno-označenih dreves s korenem z množico listov X : usmerjena povezava $xy \in E$ obstaja natanko tedaj, ko edina pot v drevesu T , ki povezuje najmanjšega skupnega predhodnika $\text{lca}(x, y)$ točk x in y z y , vsebuje najmanj eno povezavo označeno z 1. Obravnavamo neusmerjeno verzijo Fitcheve ksenološke relacije, pri kateri sta x in y ksenologa natanko tedaj, ko edina pot med x in y v T vsebuje povezavo z oznako 1. Pokažemo, da simetrične Fitcheve relacije sovpadajo z razredom polnih večdelnih grafov in tako ne morejo prenašati nobene netrivialne filogenetske informacije.

Ključne besede: Označena drevesa, prepovedani podgrafi, filogenetika, ksenologija, Fitchev graf.

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