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Distance labelings: a generalization of Langford sequences

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Abstract: A Langford sequence of order m and defect d can be identified with a labeling of the vertices of a path of order $2m$ in which each label from d up to $d + m - 1$ appears twice and in which the vertices that have been labeled with k are at distance k . In this paper, we introduce two generalizations of this labeling that are related to distances. The basic idea is to assign nonnegative integers to vertices in such a way that if n vertices ($n > 1$) have been labeled with k then they are mutually at distance k . We study these labelings for some well known families of graphs. We also study the existence of these labelings in general. Finally, given a sequence or a set of nonnegative integers, we study the existence of graphs that can be labeled according to this sequence or set.

Keywords: Langford sequence, distance l -labeling, distance J -labeling, δ -sequence, δ -set.

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Razdaljna številčenja: posplošitev Langfordovih zaporedij

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Povzetek: Langfordovo zaporedje reda m in defekta d lahko identificiramo s številčenjem vozlišč poti reda $2m$, pri katerem vsaka oznaka od d do $d + m - 1$ nastopa dvakrat, vozlišča označena s k pa so na razdalji k . V tem članku vpeljemo dve posplošitvi tega številčenja, ki sta povezani z razdaljami. Osnovna ideja je prirediti nenegativna cela števila vozliščem tako, da velja: če je n vozlišč ($n > 1$) označenih s k , potem so ta med seboj na razdalji k . Študiramo ta številčenja za nekatere dobro znane družine grafov. Študiramo tudi obstoj teh številčenj v splošnem. Nazadnje, če je dano zaporedje ali množica nenegativnih števil, študiramo obstoj grafov, ki jih lahko oštevilčimo v skladu s tem zaporedjem oziroma množico.

Ključne besede: Langfordovo zaporedje, razdaljno l -številčenje, razdaljno J -številčenje, δ -zaporedje, δ -množica.

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