

# Total positivity of Toeplitz matrices of recursive hypersequences\*

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## Abstract

We present a new class of totally positive Toeplitz matrices composed of recently introduced hyperfibonacci numbers of the  $r$ -th generation. As a consequence, we obtain that all sequences  $F_n^{(r)}$  of hyperfibonacci numbers of  $r$ -th generation are log-concave for  $r \geq 1$  and large enough  $n$ .

*Keywords:* Total positivity, totally positive matrix, Toeplitz matrix, Hankel matrix, hyperfibonacci sequence, log-concavity.

*Math. Subj. Class.:* 15B36, 15A45

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# Totalna pozitivnost Toeplitzevih matrik rekurzivnih hiperzaporedij\*

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## Povzetek

Predstavimo nov razred totalno pozitivnih Toeplitzevih matrik, sestavljenih iz nedavno vpeljanih hiperfibonaccijskih števil  $r$ -te generacije. Pokažemo, da so vsa zaporedja  $F_n^{(r)}$  hiperfibonaccijskih števil  $r$ -te generacije log-konkavna za  $r \geq 1$  in dovolj velike  $n$ .

*Ključne besede:* Totalna pozitivnost, totalno pozitivna matrika, Toeplitzeva matrika, Hankelova matrika, hiperfibonaccijsko zaporedje, log-konkavnost.

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