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On Jacobian group and complexity of the I -graph $I(n, k, l)$ through Chebyshev polynomials

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Abstract: We consider a family of I -graphs $I(n, k, l)$, which is a generalization of the class of generalized Petersen graphs. In the present paper, we provide a new method for counting Jacobian group of the I -graph $I(n, k, l)$. We show that the minimum number of generators of $\text{Jac}(I(n, k, l))$ is at least two and at most $2k + 2l - 1$. Also, we obtain a closed formula for the number of spanning trees of $I(n, k, l)$ in terms of Chebyshev polynomials. We investigate some arithmetical properties of this number and its asymptotic behaviour.

Keywords: Spanning tree, Jacobian group, I -graph, Petersen graph, Chebyshev polynomial.

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O Jacobijevi grupi in kompleksnosti I -grafa $I(n, k, l)$ v zvezi s polinomi Čebiševa

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Povzetek: Obravnavamo družino I -grafov $I(n, k, l)$, ki predstavlja posplošitev razreda posplošenih Petersenovih grafov. V tem članku podamo novo metodo štetja v Jacobijevi grupi I -grafa $I(n, k, l)$. Pokažemo, da je minimalno število generatorjev grupe $\text{Jac}(I(n, k, l))$ najmanj dve in največ $2k + 2l - 1$. Podamo tudi zaključeno formulo za število vpetih dreves grafa $I(n, k, l)$, izraženo s polinomi Čebiševa. Raziskujemo nekaj aritmetičnih lastnosti tega števila in njegovo asimptotično vedenje.

Ključne besede: Vpeto drevo, Jacobijeva grupa, I -graf, Petersenov graf, polinom Čebiševa.

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