

## Jacobian and complexity of the $I$ -graphs

Ilya Mednykh

*Sobolev Institute of Mathematics, Novosibirsk, Russia*

*Novosibirsk State University, Novosibirsk, Russia*

ilyamednykh(at)mail.ru

We consider a family of  $I$ -graphs  $I(n, k, l)$ , which is a generalization of the class of generalized Petersen graphs [1]. In the present paper, we develop a new method for counting Jacobian group [2, 3] and apply it for the  $I$ -graph  $I(n, k, l)$ . We show that the minimum number of generators of  $Jac(I(n, k, l))$  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.

**Acknowledgments.** The work has been supported by RFBR (grants 16-31-00138, 18-01-00420 and 18-501-51021) and by the program of fundamental researches of the SB RAS no.I.1.2., project 0314-2016-0007.

## References

- [1] N. L. Biggs, Three remarkable graphs. *Canad. J. Math.* **25** (1973) 397–411.
- [2] Y. S. Kwon, A. D. Mednykh, I. A. Mednykh, On Jacobian group and complexity of the generalized Petersen graph  $GP(n, k)$  through Chebyshev polynomials. *Linear Algebra and its Applications* **529** (2017) 355–373.
- [3] I. A. Mednykh, On Jacobian group and complexity of the  $I$ -graph  $I(n, k, l)$  through Chebyshev polynomials. *Ars Mathematica Contemporanea* (to appear) (2018) 18 pp.