

International scientific conference
**«Algebraic and geometric
methods of analysis»**

Book of abstracts



May 30 - June 4, 2018,
Odesa,
Ukraine

<https://www.imath.kiev.ua/~topology/conf/agma2018>

On inequalities of generalized elliptic integrals

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As an application of the eigenfunctions \sin_p , $1 < p < \infty$ of so-called one-dimensional p -Laplacian [3], we introduce new generalized elliptic integrals K_p , E_p of the first and the second kind, respectively, and establish two-sided inequalities. As well as, we estimate above and below the perimeter $P = \int_0^{\pi_p/2} \sqrt[p]{1 - r^p \sin_p(t)^p} dt = 4aE_p(r)$ of generalized p -ellipse whose parametric equations are $x = a(1 - \sin_p(t)^p)^{1/p}$ and $y = b \sin_p(t)$ for $0 < t < 2\pi_p = 4\text{arcsin}_p(1)$.

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