1167-05-96 **Alexander Mednykh*** (smedn@mail.ru), pr. Koptuga, 4, Novosibirsk, 630090, and **Ilya Mednykh** (ilyamednykh@mail.ru), pr. Koptuga, 4, Novosibirsk, 630090. *Kirchhoff Index for Circulant Graphs.*

Let G be a finite connected graph on n vertices. Denote by $D(G)$ a diagonal matrix made up of the valences of the vertices of G, and by $A(G)$ the adjacency matrix of G. The matrix $L(G) = D(G) - A(G)$ is called the Laplacian matrix of G. For a connected graph G, all eigenvalues of $L(G)$, except for one equal to 0, are strictly positive. So the eigenvalues of the Laplacian matrix of G satisfy $0 = \lambda_1 < \lambda_2 \leq \ldots \leq \lambda_n$. Define the Kirchhoff index of a graph G by the formula

$$Kf(G) = n\sum_{j=2}^{n}\frac{1}{\lambda_j}.$$

The aim of this report is to find an analytical formula for the Kirchhoff index of circulant graphs $C_n(s_1, s_2, \ldots, s_k)$ and $C_{2n}(s_1, s_2, \ldots, s_k, n)$ with even and odd valency respectively. The asymptotic behavior of the Kirchhoff index as $n \to \infty$ is investigated. We prove that the Kirchhoff index of a circulant graph can be expressed as a sum of a cubic polynomial in n and a remainder that vanishes exponentially as $n \to \infty$. (Received February 22, 2021)