

On the Properties of Knots and Links Constructed from Plane Graphs

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In this paper, I consider the possibility of using graph theory to study alternating knots and links, which we will simply call knots in what follows. Alternating knot can be built from arbitrary plane connected graph using Christian Merkat algorithm. We call such a graph the associated knot graph. You can carry out the inverse procedure: to build its associated graph for the knot. Using these properties, the study of this knot can be reduced to the study of its associated graph. However, for this you need to know how they are connected. In the work, various plane associated graphs were taken and the knots corresponding to them were considered. It was investigated how the number of knot's components varies depending on the type of graph and its varieties. In the paper there were considered several simple types of associated graphs such as a tree, a cycle, and their combinations. For each of them, regularities of the number of their knots components were found and proved. In addition, a method of simplifying associated graphs was developed. It allows to determine the number of components in a knot by writing and simplifying, according to certain rules, some expression for a graph.

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