

Abstract

This thesis is concerned with quasigroups with a small number of associative triples. The minimum number of associative triples among quasigroups of orders up to seven has already been determined. The goal of this thesis is to determine the minimum for orders eight and nine. This thesis reports that the minimum number of associative triples among quasigroups of order eight is sixteen and among quasigroups of order nine is nine. The latter finding is rather significant and we present a construction of an infinite series of quasigroups with the number of associative triples equal to their order. Findings of this thesis have been a result of a computer search which used improved algorithm presented in this thesis. The first part of the thesis is devoted to the theory that shows how to reduce the search space. The second part deals with the development of the algorithm and the last part analyzes the findings and shows a comparison of the new algorithm to the previous work. It shows that new search program is up to four orders of magnitude faster than the one used to determine the minimum number of associative triples among quasigroups of order seven.