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 n -T-quasigroup codes with one check symbol and their error detection capabilities

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Abstract: It is well known that there exist some types of the most frequent errors made by human operators during transmission of data which it is possible to detect using a code with one check symbol. We prove that there does not exist an n -T-code that can detect all single, adjacent transposition, jump transposition, twin, jump twin and phonetic errors over an alphabet that contains 0 and 1. Systems that detect all single, adjacent transposition, jump transposition, twin, jump twin errors and almost all phonetic errors of the form $a0 \rightarrow 1a$, $a \neq 0$, $a \neq 1$ over alphabets of different, and minimal size, are constructed. We study some connections between the properties of anti-commutativity and parastroph orthogonality of T-quasigroups. We also list possible errors of some types (jump transposition, twin error, jump twin error and phonetic error) that the system of the serial numbers of German banknotes cannot detect.

Keywords: quasigroup, n -ary quasigroup, check character system, code, the system of the serial numbers of German banknotes

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