

On the number of contractions in the finite full transformation semigroup

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Abstract: Let $X_n = \{1, 2, 3, \dots, n\}$ and T_n be the full transformation semigroup on X_n , that is the semigroup of all full transformation of the set X_n . A transformation α in T_n is said to be a contraction if $|\alpha(x) - \alpha(y)| \leq |x - y|$ for all $x, y \in X_n$. The transformation α in T_n is order preserving if $x \leq y \Rightarrow \alpha(x) \leq \alpha(y)$ for all $x, y \in X_n$. In this paper we denote by CT_n and OCT_n the subsemigroups of T_n consisting respectively of all contraction and order preserving contraction in T_n (number of elements in each of the semigroup) and obtain formulae for the order of the two semigroups.

Keywords: Contraction, semigroup, subsemigroup, order preserving, full transformation