Meeting: 999, Nashville, Tennessee, SS 13A, Special Session on Semigroup Theory

999-20-60 **Inessa Levi*** (i-levi@wiu.edu), Mathematics Department, Western Illinois University, Macomb, IL 61455. *On Ranks of Semigroups of Order-Preserving and Orientation-Preserving Transformations.* Preliminary report.

The rank of a finite semigroup is the minimal size of its generating set. If a semigroup is idempotent-generated, its idempotent rank is the minimal size of its generating set of idempotents.

A transformation α of a finite set $N = \{1, 2, \ldots, n\}$ is *order-preserving* if it preserves the natural order on N, that is $x \leq y \Rightarrow x\,\alpha \leq y\,\alpha$ for all $x, y \in N\}$. A transformation α of N is *orientation-preserving* if the sequence $(1\alpha, 2\alpha, \ldots, n\alpha)$ is a cyclic permutation of a nondecreasing sequence.

Two partitions of N have the same type if they have the same number of classes of each size. We study the semigroups generated by the order-preserving [the orientation-preserving] transformations of N whose kernels are partitions of N of the same type as a given partition τ. We show that the rank of each such semigroup is $\binom{n}{r}$, where r is the number of classes of τ. We characterize all such semigroups generated by their idempotent elements, and show that the idempotent ranks of these semigroups are equal to their ranks. (Received August 02, 2004)