

Abstract submitted for Thirty-Third Annual Victorian Algebra Conference

Title: Long chains of subsemigroups

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The length of a semigroup S is defined to be the largest size of a chain of subsemigroups of S . An exact formula for the length of the symmetric group on n points was found by Cameron, Solomon and Turull; the length is roughly $3n/2$. In general, it follows by Lagrange's Theorem that the length of a group is at most the logarithm of the group order. Semigroups refuse to be as well-behaved. The only valid upper bound for the length of an arbitrary semigroup is its size. For example, any zero-semigroup has length equal to its size. Even for less degenerate and more natural examples of semigroups, the contrast to groups is noticeable. We will see that the length of the full transformation semigroup on n points, the semigroup analogue to the symmetric group, is asymptotically at least a constant multiple of its size.