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The Cayley semigroup of a finite semigroup.

Let S be a finite semigroup. Rhodes considered in 1965 a function defined on the free monoid S^* . He called this the machine of the semigroup. Formally, to each element s of the semigroup, he assigned a function $\varphi_s : S^* \rightarrow S^*$, defined by $\varphi_s([a_1, a_2, \dots, a_n]) = [sa_1, sa_1a_2, \dots, sa_1a_2 \cdots a_n]$. Essentially, these functions arise from considering the Cayley graph to be a sequential machine and assigning the function φ_s to each state s of S . We call the semigroup generated by all such functions the Cayley semigroup of S , and denote it by $Cayley(S)$. If S happens to be an abelian group, $Cayley(S)$ will be a lamplighter group.

We will show that if S is an aperiodic semigroup, then $Cayley(S)$ is finite and aperiodic. (Received February 27, 2007)