1023-08-385 **Steve Seif*** (`swseif01@louisville.edu`), Mathematics Department, University of Louisville, Louisville, KY 40292. *"The free spectrum of the Perkins semigroup is sub-log-exponential".*

Let $\mathbf{A}$ be a finite algebra with free-spectrum $(f_n^{\mathbf{A}})_{n=1,2,\dots}$. $\mathbf{A}$ is **log-exponential** if there exists a positive number c such that $f_n^{\mathbf{A}} \geq 2^{2^{cn}}$; otherwise $\mathbf{A}$ is sub-log-exponential.

A result of G. Higman and P.M. Neumann states that a finite group is sub-log-exponential if and only if it is nilpotent.

Let $\mathbf{N}$ be the pseudovariety of semigroups whose subgroups are nilpotent. The author has shown that a finite monoid $\mathbf{A}$ is sub-log-exponential implies that $\mathbf{A}$ is in $\mathbf{EDA}$. The author conjectures that a finite monoid $\mathbf{A}$ is sub-log-exponential if and only if $\mathbf{A} \in \mathbf{N} \cap \mathbf{EDA}$.

A first and serious obstacle along the way to a proof of the conjecture is removed: the author has proven that the Perkins semigroup $\mathbf{B}_2^1$ is sub-log-exponential. The proof, which will be described in the talk, involves the introduction of so-called *alternation word digraphs*, a class of acyclic digraphs that extends posets. (Received September 10, 2006)