1056-06-1283 **Benjamin Wells*** (wells@usfca.edu), Department of Mathematics, University of San Francisco, 2130 Fulton Street, San Francisco, CA 94117. *A gap theorem for the poset of sequential degrees.* Preliminary report.

Let $m = \{0, 1, ..., m-1\}$ be the finite alphabet for a finite-state no-delay machine (or Moore transducer) M with states Q_M, initial state I_M, state-transition function $(q, k) \to qk$, and output function $\mathcal{O}_M : Q_M \to m$. For $\alpha, \beta \in {}^\omega m$, $\alpha M = \beta$ when inductively defined states and outputs satisfy $q_0 = I_M \alpha_0, q_{i+1} = q_i \alpha_{i+1}$, and $q_i \mathcal{O}_M = \beta_i$ for all $i \in \omega$. We write $\alpha \Rightarrow \beta$ and say β is *sequentially reducible to* α iff there is such an M. Then $\Rightarrow$ is a preorder on ${}^\omega m$, and $D = \langle {}^\omega m / \Leftrightarrow, \Leftarrow / \Leftrightarrow \rangle$ is the corresponding poset of *sequential degrees*. Let $B_{\Omega(m)}$ be the Boolean algebra with number of generators equal to the count of nondistinct prime divisors of m.

Gap Theorem. *Let ψ be an incompressible sequence. Then the shift interval of ψ*

$$\{\delta \in D : \psi \Leftarrow \delta \Leftarrow \psi^\sharp = \psi|^{\omega \sim \{0\}} m\}$$

is a Boolean subalgebra order-isomorphic to $B_{\Omega(m)}$, and the order closure in D of the shift chain of ψ is order-isomorphic to the chain sum $B_{\Omega(m)} \oplus \mathbb{Z}$. (Received September 21, 2009)