Shuaibing Luo and Stefan Richter* (richter@math.utk.edu), Department of Mathematics, University of Tennessee, Knoxville, TN 37996. Hankel operators on the Dirichlet space. Preliminary report.

Let $D$ denote the Dirichlet space of analytic functions $f$ on the open unit disc $\mathbb{D}$ such that $f'$ is square integrable over $\mathbb{D}$, and let $S$ denote the Dirichlet shift, i.e. the operator defined on $D$ by $Sf(z) = zf(z)$. An operator $A \in B(D)$ is called a Hankel operator, if $AS = S^*A$. It is clear that the null space of a Hankel operator is invariant for $S$ and the closure of its range is invariant for $S^*$.

We show that one recovers all invariant subspaces of $S$ and $S^*$ this way. This fact motivates the proof of the following analogue of a Bergman space result of Shimorin’s: If for $n = 1, 2, \ldots$ $\mathcal{M}_n$ and $\mathcal{M}$ are non-zero $S$-invariant subspaces with projections $P_n$ and $P$ and extremal functions $\varphi_n$ and $\varphi$, then $P_n \to P$ in the weak operator topology, if and only if $\varphi_n \to \varphi$ locally uniformly in $\mathbb{D}$. (Received January 23, 2014)