

Volterra Invariant Subspaces of H^p ($p > 1$)

Boris Korenblum

(Joint work with A. Aleman, Lund University, Sweden)

Abstract

Let a and p be fixed, $|a| \leq 1, p > 1$. Volterra operator $V_a : H^p \rightarrow H^p$ is defined by

$$V_a f(z) = \int_a^z f(\zeta) d\zeta$$

A proper subspace \mathcal{M} of H^p is called V_a -invariant if $V_a \mathcal{M} \subset \mathcal{M}$.

Theorem. Let $|a| < 1$. \mathcal{M} is V_a -invariant if and only if there exists a positive integer N such that

$$\mathcal{M} = b_a^N H^p$$

where $b_a(z) = \frac{a-z}{1-\bar{a}z}$.

Theorem 2. Let $|a| = 1$. \mathcal{M} is V_a -invariant if and only if there is $t > 0$ such that

$$\mathcal{M} = S_a^t H^p$$

where $S_a^t(z) = \exp \frac{z+a}{z-a}$.