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CYCLIC VECTORS FOR INVARIANT SUBSPACES IN SOME CLASSES OF ANALYTIC FUNCTIONS

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1. Let ψ be a positive increasing function on $(0, \infty)$ such that

$$\lim_{t \downarrow 0} \psi(t) = 0, \psi(t) = \psi(1) \text{ for } t > 1 \quad \text{and} \quad \int_0^1 \frac{1}{\psi(t)}\, dt < \infty.$$

Define

$$M_\psi = \left\{ f \in H^\infty | M_\infty(f', r) = o\left(\frac{\psi(1-r)}{1-r} \right) \right\}$$

and

$$L_\psi = \left\{ f \in H^\infty \middle| \int_0^1 \frac{M_\infty(f', r)}{\psi(1-r)}\, dr < \infty \right\},$$

where H^∞ is the space of bounded analytic functions on the unit disk, and

$$M_\infty(g, r) = \sup_{|z|=r} |g(z)| = \sup_{|z|\le r} |g(z)|.$$

Each of the spaces M_ψ and L_ψ becomes a Banach algebra under the norms

$$\|f\|_{M_\psi} = \|f\|_\infty + \sup_{0<r<1} \frac{(1-r) M_\infty(f', r)}{\psi(1-r)},$$

$$\|f\|_{L_\psi} = \|f\|_\infty + \int_0^1 \frac{M_\infty(f', r)}{\psi(1-r)}\, dr$$

respectively. Since $M_\infty(f', r)$ is increasing and $\psi(1-r)$ is decreasing, it is

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