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Essential Spectrum of Some Composition Operators on $H^2(D)$

Let φ be an analytic function, not an automorphism, mapping the open disk into itself and suppose there is a point a with $|a| < 1$ for which $\varphi(a) = a$. The first general theorem about the spectrum of a composition operator on $H^2(D)$ with such a symbol was proved by H. Kamowitz (1975):

$$\sigma(C_\varphi) = \{\lambda : |\lambda| \leq \rho\} \cup \{\varphi'(a)^n : n = 1, 2, \cdots\} \cup \{1\}$$

where ρ is the essential spectral radius of C_φ. In joint work with Eva Gallardo-Gutiérrez, we show that the essential spectrum of C_φ is

$$\sigma_e(C_\varphi) = \{\lambda : |\lambda| \leq \rho\}$$