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A new necessary condition for the spectral Nevanlinna-Pick problem

Let $U \subset \mathbb{C}$ be the unit disc, and denote by Ω_n the set of $n \times n$ complex matrices with spectral radius < 1 . The spectral Nevanlinna-Pick problem asks for necessary and sufficient conditions on the (distinct) numbers $z_1, \dots, z_m \in U$, and on the matrices $W_1, \dots, W_m \in \Omega_n$ for the existence of a holomorphic function $F: U \rightarrow \Omega_n$ which satisfies $F(z_j) = W_j$ for all j . This very difficult problem has only been solved for $n = m = 2$. We will present a new Schwarz lemma and apply it to examples with $m > 2$ that could not be decided with previous Schwarz lemmas.